DOCUMENT RESUME

ED 383 914 CE 069 315

TITLE Mt. Hood Community College National Tech Prep Demonstration Center. Concluding Performance Report.
INSTITUTION Mount Hood Community Coll., Gresham, Oreg.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE 31 Dec 94
NOTE 420p.
PUB TYPE Reports - Descriptive (141) -- Statistical Data (110)

EDRS PRICE MF01/PC17 Plus Postage.
DESCRIPTORS Academic Education; Annual Reports; Articulation (Education); *Clearinghouses; College School Cooperation; Community Colleges; Data Analysis; Data Collection; *Demonstration Programs; Economics; English; High Schools; *Information Dissemination; Learning Activities; Mathematics; Program Development; Program Effectiveness; *Technical Assistance; Technical Education; *Tech Prep; Two Year Colleges
IDENTIFIERS *Mount Hood Community College OR

ABSTRACT

The Mt. Hood Community College National Tech Prep Demonstration Center program is described in this performance report. The report details the following activities through which the center contributed significantly to educational reform: (1) information dissemination (including distributing information packets to more than 2,770 sites, hosting 63 group visitations, speaking at various national conferences, producing/distributing 5 newsletters, and sponsoring workshops and staff development projects); (2) technical assistance to other sites (including technical assistance delivered via site visits, internships, phone conversations, and workshops); and (3) data collection and analysis (including through consortium membership and participation in research and evaluation meetings). Appendixes constituting more than 95% of this document include the following: list of presentations made by center staff; sample summer newsletter; materials from a joint workshop on curriculum articulation in mathematics that was cosponsored by the center; two reports evaluating professional technical programs in the Mt. Hood Regional Cooperative Consortium; statistical data on information dissemination and site visits; list of center benchmarks and milestones; and sample packets of applied mathematics, applied economics, and applied English curriculum materials. (MN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 383 914

NATIONAL TECH PREP

DEMONSTRATION CENTER

Mt. Hood Community College
26000 SE Stark Street
Gresham, OR 97030

CONCLUDING PERFORMANCE REPORT

December 31, 1994

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it

☐ Minor changes have been made to improve reproduction quality

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

INSTRUCTIONAL SERVICES (503) 667-7312 FAX: (503) 667-7679

CE 069 315

BEST COPY AVAILABLE

TABLE OF CONTENTS

PAGE

DISSEMINATION OF INFORMATION 1

TECHNICAL ASSISTANCE TO OTHER SITES 3

PROGRESS IN COLLECTING AND ANALYZING DATA 4

PROBLEMS ENCOUNTERED 5

BUDGET BREAKDOWN 5

SUMMARY 5

APPENDIXES

A PRESENTATIONS by Dr. Jack Miller, Ms. Pamela Matthews, and Dr. Elaine Johnson

B SUMMER NEWSLETTER OF THE MT. HOOD NATIONAL TECH PREP DEMONSTRATION CENTER

C JOINT WORKSHOP ON CURRICULUM ARTICULATION IN MATHEMATICS - Co-sponsored by the Mt. Hood National Tech Prep Demonstration Center

D EVALUATION OF PROFESSIONAL TECHNICAL PROGRAMS IN THE MT. HOOD REGIONAL COOPERATIVE CONSORTIUM

E TOTAL DISSEMINATIONS / VISITATIONS TO DATE with state-by-state reports

F BENCHMARKS & MILESTONES - 1994-1995

G SAMPLE PACKETS OF APPLIED MATHEMATICS, APPLIED ECONOMICS, AND APPLIED ENGLISH

MT. HOOD COMMUNITY COLLEGE

NATIONAL TECH PREP DEMONSTRATION CENTER

CONCLUDING REPORT

The following is the concluding report for the Mt. Hood Community College National Tech Prep Demonstration Center grant, implemented in January 1993 and ending December 31, 1994. This report reflects the Center's accomplishments and activities during this period.

DISSEMINATION OF INFORMATION

Because this grant's major purpose was dissemination of information and evaluation, this was also Mt. Hood Community College's major thrust in the majority of the Center's activities. Although activities slowed considerably toward the end of the grant period, our efforts have been highly rewarding to those beneficiaries of our dissemination activities.

- As of December 31, 1994, the Center has provided packets of information to over 2,770 sites over the nation and in five foreign countries. In response to requests for information, we developed supplemental packets of articulation agreements, high school course guides, counseling, and marketing guidelines. These were added to our general packet of information and sent as additional information to sites requesting such information.

- Pamela Matthews and Elaine Johnson provided the Center with packets of their integrated and applied learning packets in communications and mathematics, and these packets were also sent to requesting sites.

- The Center has hosted 63 group visitations to the Mt. Hood Community College campus and to our eight area high school tech prep sites. These groups have come from 27 states and have consisted of from 1 to 50 individuals. The Center also hosted visitations from New Zealand and Australia. Associate deans Pamela Matthews and Elaine Johnson of the Mt. Hood Community College Mathematics and Literature and Composition Divisions, respectively, participated in these presentations, which were supplemented by visitations to our eight district high schools to enable these groups to get first-hand information from active Tech Prep programs. Our counseling department also cooperated by providing information to visiting groups in the form of question-answer sessions and written materials on how to coordinate and promote Tech Prep and Applied Academics. Appendix E contains a breakdown of the visitation sites and material dissemination sites.

- The Center developed a convention booth that represents all nine NTDP Centers. To date, we have presented this booth at the 1993 and 1994 AACC national conventions and to the 1993 and 1994 AVA national conventions. Over 1,000 organizations walked away from the AVA convention with dissemination materials from all nine Centers and an additional 700+ received dissemination materials by way of their leaving their cards or names/addresses at the booth, which were then made into labels at the Mt. Hood Center and sent to the other eight centers after the conventions had concluded.

- Jack Miller presented, both as a featured speaker as well as a panel participant, at a variety of conferences, including the National Tech Prep Network Convention in Anaheim, and the AACC League of Innovation, the AVA in Nashville, the Tech Prep conference in Atlanta, and the Work Now and In the Future Workshop in Portland.

- Michael Dillon also presented at a variety of organizations and conventions since taking over Dr. Miller's position.

- Both Pamela Matthews and Elaine Johnson presented, both as featured speakers at conventions and meetings and as facilitators at hands-on workshops in the area of Applied Mathematics and Applied Communications, respectively. Appendix A lists the presentation activities of Pamela Matthews, Elaine Johnson, and Jack Miller.

- We advertised our state-of-the-art program in the prominent Oregon Business Magazine, which has a distribution throughout Oregon of over 20,000 businesses and organizations. This magazine is also available at Oregon tourist bureaus.

- Numerous telephone assistance consultations have been handled over the past two years. These consultations have ranged from answering a few questions to responding in depth to help problem solve for an emerging tech prep program.

- Five newsletters have been produced and distributed to local organizations as well as to out-of-area locations via the dissemination packet.

- The Center produced a video tape entitled, *Oregon's Dream*, to promote the Oregon Tech Prep movement nationally. This project was in cooperation with Dr. Dale Parnell of Oregon State University.

- The Center also sponsored a hands-on training workshop entitled, "Teaching Mathematics in a 21st Century School, " and a three-state teleconference on applied mathematics and the graphing calculator.

- The Center presented a Tech Prep/Applied Academics workshop for our region and for out Consortium member schools in April 1994. This workshop approached the Tech Prep movement from the administrative, instructor, and counselor perspective. It was an all-day workshop, hosted on the MHCC campus. The presenters were from the National Tech Prep Demonstration Center in Southern Maryland. (See Appendix C for the brochure.)

- The Center recently co-sponsored a Joint Workshop on Curriculum Articulation in Mathematics.

- The Center sponsored a staff-development project supported in the main by Boeing Corporation and involving twelve teachers and fourteen high school students in a four-week summer internship program.

- The Center produced the *1994 Annual Report* for our consortium. This report has been highly praised by all those who have received a copy. (See Appendix F for this report.)

- The Center has developed a series of applied academics information packets in mathematics, English, and Economics, through the cooperation and participation of Pamela Matthews in Mathematics, Dr. Elaine Johnson in Literature and Composition, and Ted Scheinman in Economics, respectively. Copies of these packets are included with this reports in Appendix G.

- The Office of Research, Planning, and Computer Services at Mt. Hood Community College prepared some research material for articulated courses, found in Appendix D. Along with this is the final evaluation report of the Northwest Regional Educational Laboratories, the independent evaluators hired to evaluate the effectiveness of this grant in our Consortium.

TECHNICAL ASSISTANCE TO OTHER SITES

Our technical assistance efforts have been especially effective. We have been using our district's multi-talented personnel to provide this assistance to sites across the nation.

- Associate Dean of Mathematics Pamela Matthews, Associate Dean of Literature and Composition Dr. Elaine Johnson, and Dean of Professional Technical Development Dr. Jack Miller have visited a variety of sites across the nation to provide information on how to set up Tech Prep programs and integrate vocational and academic curriculum with both applied academics and integrated academics. Sites visited include areas in Alabama, Arizona, Illinois, Iowa, Montana, Texas, and Washington. Appendix A is a complete listing of these sites.

- In addition, both Pamela Matthews and Elaine Johnson have presented valuable hands-on workshops to many groups over the nation. Both are nationally recognized leaders in applied and/or interactive academics. Please see Appendix A for a listing of sites visited.

- The Center has provided extensive awareness programs for our District's high schools through the MHCC Counseling Office, particularly through the fine efforts of Kathleen Waldron.

- Mt. Hood Economics Instructor Ted Scheinman is developing an applied economics course for our area's high schools, sponsored by the Mt. Hood Cooperative Consortium. This course will be shared with requesting sites across the nation once it is formalized and has been tested in the classroom.

- High school tech prep instructor internships have been experienced this summer through a cooperative effort with Boeing, Fred Meyer, and Fujitsu.

- Some technical assistance has also been handled through phone requests.

- The Center has continued to work closely with the other National Tech Prep Demonstration Centers to plan dissemination projects and presentation activities, such as a workshop panel presented at the 1993 AVA convention and at other national conventions.

PROGRESS IN COLLECTING AND ANALYZING DATA

Because we realize that data collecting and analyzing is highly important to the success of our project, we have spent many hours working with our outside project evaluators. Dr. Tom Owens, our project evaluator from Northwest Regional Educational Laboratory, has developed evaluation data and has been collecting and analyzing the Center's achievements and student success. Specifically:

- The MHCC Consortium members have provided input to Northwest Regional Educational Laboratory on defining Tech Prep curriculum and students.
- Northwest Regional Educational Laboratory participated in the May one-day Consortium retreat to outline strategies for data collection and analysis.
- Multnomah ESD, through the MHCC Consortium Coordinator, Vern Halcromb, is assisting Northwest Regional Educational Laboratory in gathering data for all regional high schools regarding retention of Tech Prep student enrollment.
- The Northwest Regional Educational Laboratory presented data information and analysis to the Tech Prep Centers' National Review Committee, chaired by Dr. Dale Parnell of Oregon State University. This committee includes Dr. Dan Hull of CORD and Dr. Debra Bragg of the Center for Research and Vocational Education.
- NW Regional Educational Laboratory attended a research and evaluation meeting in March that was sponsored by the United States Department of Education. Dr. Owens is a participant in the Mathematica Project that is evaluating Tech Prep activities for PEP.
- At MHCC, the office of institution research and admission and records has met with NW Regional Educational Laboratory to develop computer programming for data collection and analysis for articulated students. A copy of this final report is located in Appendix D.
- Appendix F contains the Consortium's 1994-1995 Annual Report, which lists the statistics of our achievements, including the number of articulation agreements that have now been set up, the number of students participating in Tech Prep activities, and other pertinent data.
- Our program efforts in obtaining statistics on student completion, curriculum improvement, and secondary and post-secondary articulation efforts have been evaluated through questionnaires and follow-up studies by Northwest Regional Educational Laboratory.

These activities have been implemented during the past two years as part of the United States Department of Education grant responsibility. This is in addition to MHCC's and the Consortium's efforts to provide data as reflected in the annual Benchmarks and Milestones report that lists the Consortium's objectives, visions, and accomplishments.

PROBLEMS ENCOUNTERED

Overall, the MHCC National Tech Prep Demonstration Center project went very well; the goals of dissemination were exceeded. Our District continues to maintain a high level of interest and intensity in the Tech Prep movement, particularly in the new CAM/CIM program proscribed by the Oregon Department of Education. One major problem we encountered was having to invest far more of the grant funds in travel than had been anticipated. We did not anticipate the popularity of our major "actors," namely Pamela Matthews, Elaine Johnson, and Jack Miller, all of whom have been called upon to travel to present workshops and provide guidance in tech prep and applied academics. Sending these individuals to work on-site with large groups was a big payoff, however, to those sites who received the benefits of the on-site visits.

BUDGET BREAKDOWN

Because of the unexpected response to having Pamela Matthews, Elaine Johnson, and Dr. Miller available to visit sites and conventions to assist with Tech Prep planning and implementation, we found it necessary to realign some of our grant funds. Because of the Center's funding many off-site Tech Prep presentations to large groups, including conference panel presentations, the booth, and hands-on, off-site workshops, travel expenses were a major item in our continued successful dissemination efforts. Therefore, we realigned the grant's funds to pay for the unexpected demands for "bringing Mohammed to the mountain" (as opposed to bringing the mountain to Mohammed, which would have required a great deal more money in both the long- and short-run). We spent the travel expense budget and made a budget transfer from the Other Workshop Expenses fund to the Travel Expense fund to enable the Center to continue to provide the valuable training and information to areas away from the Mt. Hood Community College Consortium district. This enabled our Center to continue with sharing our experiences and expertise with other sites across the nation.

SUMMARY

In summary, the Center is exceeding its dissemination objectives, as outlined in our project.

- This project has significantly contributed to the educational reform movement in our local high schools as well as to the reforms taking place nationally. This effort was supported through a cooperative effort of Mt. Hood Community College faculty and other staff, members of the Mt. Hood Cooperative Consortium, the Multnomah County Educational Service District, Oregon State University, and our local business and industry representatives.

- The goal to increase articulation agreements was met. We increased articulation agreements and number of students transcripting credits in many professional-technical area of the college and in all six of the high school Certificate of Advanced Mastery (CAM) areas.

- The goals of providing a teleconferences and two workshops was exceeded by our sponsoring one four-state applied mathematics teleconference and THREE workshops for dissemination and training in Tech Prep and Applied Academics.

- The Center exceeded its expectations in the number of visitations we provided, as well as in the number of packets of information we disseminated (almost 3,000). We hosted our largest group ever in May 1994--a group of 70 high school and community college administrators and instructors from Eastern Washington, and two representatives from New Zealand who were included in this group's visitation.

- The Center made significant gains in integrating applied academics into the six CAMs prescribed by the State of Oregon, as described in the enclosed Consortium Annual Report.

- Staff development has been supported by sending district instructors to conventions, such as AVA, and by providing the teleconference and workshops free to our Consortium's member schools.

- The Center has provided information throughout our Consortium and to inquiring sites by way of our newsletters, which are included in our general dissemination packets has occurred.

- Dissemination materials that include course guidelines, sample articulation agreements, counseling materials, marketing guidelines, applied mathematics and communications packets, and many other extremely useful and popular dissemination materials were developed.

- A booth that was used at conventions as a vehicle for catching the attention of educators and administrators enabled all nine Centers to disseminate materials to a huge audience. From the AVA convention alone, the Center created mailing labels of over 375 requesting sites and distributed a set to each of the other eight sites, thereby ensuring that 375 sites across the nation received information from each of the nine demonstration sites in addition to the 200 sites that picked up materials at the booth as provided by each of the nine sites. This alone meant that in just one weekend, 575 sites across the nation received information from all nine Demonstration centers. At AACC in April 1994, we again disseminated over 400 sets of information to 400 different sites across the nation, in addition to 185 additional sets being sent through mailing labels following the conventioin. And at the 1994 AVA convention, each site disseminated over 400 packets of information.

Mt. Hood Community College deeply appreciates the rapport and recognition we have been able to maintain with the United States Department of Education through our participation in the National Tech Prep Demonstration Center grant. We commend the United States Department of Education for its foresight in planning, developing, and executing this vital national educational reform component. We look forward to working with the Department of Education in future valuable education projects.

MT. HOOD COMMUNITY COLLEGE

NATIONAL TECH PREP DEMONSTRATION CENTER

CONCLUDING REPORT

The following is the concluding report for the Mt. Hood Community College National Tech Prep Demonstration Center grant, implemented in January 1993 and ending December 31, 1994. This report reflects the Center's accomplishments and activities during this period.

DISSEMINATION OF INFORMATION

Because this grant's major purpose was dissemination of information and evaluation, this was also Mt. Hood Community College's major thrust in the majority of the Center's activities. Although activities slowed considerably toward the end of the grant period, our efforts have been highly rewarding to those beneficiaries of our dissemination activities.

- As of December 31, 1994, the Center has provided packets of information to over 2,770 sites over the nation and in five foreign countries. In response to requests for information, we developed supplemental packets of articulation agreements, high school course guides, counseling, and marketing guidelines. These were added to our general packet of information and sent as additional information to sites requesting such information.

- Pamela Matthews and Elaine Johnson provided the Center with packets of their integrated and applied learning packets in communications and mathematics, and these packets were also sent to requesting sites.

- The Center has hosted 63 group visitations to the Mt. Hood Community College campus and to our eight area high school tech prep sites. These groups have come from 27 states and have consisted of from 1 to 50 individuals. The Center also hosted visitations from New Zealand and Australia. Associate deans Pamela Matthews and Elaine Johnson of the Mt. Hood Community College Mathematics and Literature and Composition Divisions, respectively, participated in these presentations, which were supplemented by visitations to our eight district high schools to enable these groups to get first-hand information from active Tech Prep programs. Our counseling department also cooperated by providing information to visiting groups in the form of question-answer sessions and written materials on how to coordinate and promote Tech Prep and Applied Academics. Appendix E contains a breakdown of the visitation sites and material dissemination sites.

- The Center developed a convention booth that represents all nine NTDP Centers. To date, we have presented this booth at the 1993 and 1994 AACC national conventions and to the 1993 and 1994 AVA national conventions. Over 1,000 organizations walked away from the AVA convention with dissemination materials from all nine Centers and an additional 700+ received dissemination materials by way of their leaving their cards or names/addresses at the booth, which were then made into labels at the Mt. Hood Center and sent to the other eight centers after the conventions had concluded.

- Jack Miller presented, both as a featured speaker as well as a panel participant, at a variety of conferences, including the National Tech Prep Network Convention in Anaheim, and the AACC League of Innovation, the AVA in Nashville, the Tech Prep conference in Atlanta, and the Work Now and In the Future Workshop in Portland.

- Michael Dillon also presented at a variety of organizations and conventions since taking over Dr. Miller's position.

- Both Pamela Matthews and Elaine Johnson presented, both as featured speakers at conventions and meetings and as facilitators at hands-on workshops in the area of Applied Mathematics and Applied Communications, respectively. Appendix A lists the presentation activities of Pamela Matthews, Elaine Johnson, and Jack Miller.

- We advertised our state-of-the-art program in the prominent Oregon Business Magazine, which has a distribution throughout Oregon of over 20,000 businesses and organizations. This magazine is also available at Oregon tourist bureaus.

- Numerous telephone assistance consultations have been handled over the past two years. These consultations have ranged from answering a few questions to responding in depth to help problem solve for an emerging tech prep program.

- Five newsletters have been produced and distributed to local organizations as well as to out-of-area locations via the dissemination packet.

- The Center produced a video tape entitled, *Oregon's Dream*, to promote the Oregon Tech Prep movement nationally. This project was in cooperation with Dr. Dale Parnell of Oregon State University.

- The Center also sponsored a hands-on training workshop entitled, "Teaching Mathematics in a 21st Century School, " and a three-state teleconference on applied mathematics and the graphing calculator.

- The Center presented a Tech Prep/Applied Academics workshop for our region and for out Consortium member schools in April 1994. This workshop approached the Tech Prep movement from the administrative, instructor, and counselor perspective. It was an all-day workshop, hosted on the MHCC campus. The presenters were from the National Tech Prep Demonstration Center in Southern Maryland. (See Appendix C for the brochure.)

- The Center recently co-sponsored a Joint Workshop on Curriculum Articulation in Mathematics.

- The Center sponsored a staff-development project supported in the main by Boeing Corporation and involving twelve teachers and fourteen high school students in a four-week summer internship program.

- The Center produced the *1994 Annual Report* for our consortium. This report has been highly praised by all those who have received a copy. (See Appendix F for this report.)

- The Center has developed a series of applied academics information packets in mathematics, English, and Economics, through the cooperation and participation of Pamela Matthews in Mathematics, Dr. Elaine Johnson in Literature and Composition, and Ted Scheinman in Economics, respectively. Copies of these packets are included with this reports in Appendix G.

- The Office of Research, Planning, and Computer Services at Mt. Hood Community College prepared some research material for articulated courses, found in Appendix D. Along with this is the final evaluation report of the Northwest Regional Education Laboratories, the independent evaluators hired to evaluate the effectiveness of this grant in our Consortium.

TECHNICAL ASSISTANCE TO OTHER SITES

Our technical assistance efforts have been especially effective. We have been using our district's multi-talented personnel to provide this assistance to sites across the nation.

- Associate Dean of Mathematics Pamela Matthews, Associate Dean of Literature and Composition Dr. Elaine Johnson, and Dean of Professional Technical Development Dr. Jack Miller have visited a variety of sites across the nation to provide information on how to set up Tech Prep programs and integrate vocational and academic curriculum with both applied academics and integrated academics. Sites visited include areas in Alabama, Arizona, Illinois, Iowa, Montana, Texas, and Washington. Appendix A is a complete listing of these sites.

- In addition, both Pamela Matthews and Elaine Johnson have presented valuable hands-on workshops to many groups over the nation. Both are nationally recognized leaders in applied and/or interactive academics. Please see Appendix A for a listing of sites visited.

- The Center has provided extensive awareness programs for our District's high schools through the MHCC Counseling Office, particularly through the fine efforts of Kathleen Waldron.

- Mt. Hood Economics Instructor Ted Scheinman is developing an applied economics course for our area's high schools, sponsored by the Mt. Hood Cooperative Consortium. This course will be shared with requesting sites across the nation once it is formalized and has been tested in the classroom.

- High school tech prep instructor internships have been experienced this summer through a cooperative effort with Boeing, Fred Meyer, and Fujitsu.

- Some technical assistance has also been handled through phone requests.

- The Center has continued to work closely with the other National Tech Prep Demonstration Centers to plan dissemination projects and presentation activities, such as a workshop panel presented at the 1993 AVA convention and at other national conventions.

PROGRESS IN COLLECTING AND ANALYZING DATA

Because we realize that data collecting and analyzing is highly important to the success of our project, we have spent many hours working with our outside project evaluators. Dr. Tom Owens, our project evaluator from Northwest Regional Education Laboratory, has developed evaluation data and has been collecting and analyzing the Center's achievements and student success. Specifically:

- The MHCC Consortium members have provided input to NW Regional Education Laboratory on defining Tech Prep curriculum and students.
- NW Regional Education Laboratory participated in the May one-day Consortium retreat to outline strategies for data collection and analysis.
- Multnomah ESD, through the MHCC Consortium Coordinator, Vern Halcromb, is assisting NW Regional Education Laboratory in gathering data for all regional high schools regarding retention of Tech Prep student enrollment.
- The NW Regional Education Laboratory presented data information and analysis to the Tech Prep Centers' National Review Committee, chaired by Dr. Dale Parnell of Oregon State University. This committee includes Dr. Dan Hull of CORD and Dr. Debra Bragg of the Center for Research and Vocational Education.
- NW Regional Educational Laboratory attended a research and evaluation meeting in March that was sponsored by the United States Department of Education. Dr. Owens is a participant in the Mathematica Project that is evaluating Tech Prep activities for PEP.
- At MHCC, the office of institution research and admission and records has met with NW Regional Educational Laboratory to develop computer programming for data collection and analysis for articulated students. A copy of this final report is located in Appendix D.
- Appendix F contains the Consortium's 1994-1995 Annual Report, which lists the statistics of our achievements, including the number of articulation agreements that have now been set up, the number of students participating in Tech Prep activities, and other pertinent data.
- Our program efforts in obtaining statistics on student completion, curriculum improvement, and secondary and post-secondary articulation efforts have been evaluated through questionnaires and follow-up studies by NW Regional Education Laboratory.

These activities have been implemented during the past two years as part of the United States Department of Education grant responsibility. This is in addition to MHCC's and the Consortium's efforts to provide data as reflected in the annual Benchmarks and Milestones report that lists the Consortium's objectives, visions, and accomplishments.

PROBLEMS ENCOUNTERED

Overall, the MHCC National Tech Prep Demonstration Center project went very well; the goals of dissemination were exceeded. Our District continues to maintain a high level of interest and intensity in the Tech Prep movement, particularly in the new CAM/CIM program proscribed by the Oregon Department of Education. One major problem we encountered was having to invest far more of the grant funds in travel than had been anticipated. We did not anticipate the popularity of our major "actors," namely Pamela Matthews, Elaine Johnson, and Jack Miller, all of whom have been called upon to travel to present workshops and provide guidance in tech prep and applied academics. Sending these individuals to work on-site with large groups was a big payoff, however, to those sites who received the benefits of the on-site visits.

BUDGET BREAKDOWN

Because of the unexpected response to having Pamela Matthews, Elaine Johnson, and Dr. Miller available to visit sites and conventions to assist with Tech Prep planning and implementation, we found it necessary to realign some of our grant funds. Because of the Center's funding many off-site Tech Prep presentations to large groups, including conference panel presentations, the booth, and hands-on, off-site workshops, travel expenses were a major item in our continued successful dissemination efforts. Therefore, we realigned the grant's funds to pay for the unexpected demands for "bringing Mohammed to the mountain" (as opposed to bringing the mountain to Mohammed, which would have required a great deal more money in both the long- and short-run). We spent the travel expense budget and made a budget transfer from the Other Workshop Expenses fund to the Travel Expense fund to enable the Center to continue to provide the valuable training and information to areas away from the Mt. Hood Community College Consortium district. This enabled our Center to continue with sharing our experiences and expertise with other sites across the nation.

SUMMARY

In summary, the Center is exceeding its dissemination objectives, as outlined in our project.

- This project has significantly contributed to the educational reform movement in our local high schools as well as to the reforms taking place nationally. This effort was supported through a cooperative effort of Mt. Hood Community College faculty and other staff, members of the Mt. Hood Cooperative Consortium, the Multnomah County Educational Service District, Oregon State University, and our local business and industry representatives.

- The goal to increase articulation agreements was met. We increased articulation agreements and number of students transcripting credits in many professional-technical area of the college and in all six of the high school Certificate of Advanced Mastery (CAM) areas.

- The goals of providing a teleconferences and two workshops was exceeded by our sponsoring one four-state applied mathematics teleconference and THREE workshops for dissemination and training in Tech Prep and Applied Academics.

- The Center exceeded its expectations in the number of visitations we provided, as well as in the number of packets of information we disseminated (almost 3,000). We hosted our largest group ever in May 1994--a group of 70 high school and community college administrators and instructors from Eastern Washington, and two representatives from New Zealand who were included in this group's visitation.

- The Center made significant gains in integrating applied academics into the six CAMs prescribed by the State of Oregon, as described in the enclosed Consortium Annual Report.

- Staff development has been supported by sending district instructors to conventions, such as AVA, and by providing the teleconference and workshops free to our Consortium's member schools.

- The Center has provided information throughout our Consortium and to inquiring sites by way of our newsletters, which are included in our general dissemination packets has occurred.

- Dissemination materials that include course guidelines, sample articulation agreements, counseling materials, marketing guidelines, applied mathematics and communications packets, and many other extremely useful and popular dissemination materials were developed.

- A booth that was used at conventions as a vehicle for catching the attention of educators and administrators enabled all nine Centers to disseminate materials to a huge audience. From the AVA convention alone, the Center created mailing labels of over 375 requesting sites and distributed a set to each of the other eight sites, thereby ensuring that 375 sites across the nation received information from each of the nine demonstration sites in addition to the 200 sites that picked up materials at the booth as provided by each of the nine sites. This alone meant that in just one weekend, 575 sites across the nation received information from all nine Demonstration centers. At AACC in April 1994, we again disseminated over 400 sets of information to 400 different sites across the nation, in addition to 185 additional sets being sent through mailing labels following the conventioin. And at the 1994 AVA convention, each site disseminated over 400 packets of information.

Mt. Hood Community College deeply appreciates the rapport and recognition we have been able to maintain with the United States Department of Education through our participation in the National Tech Prep Demonstration Center grant. We commend the United States Department of Education for its foresight in planning, developing, and executing this vital national educational reform component. We look forward to working with the Department of Education in future valuable education projects.

Appendix A

PRESENTATIONS

by

Dr. Jack Miller, Dean
Professional Technical Development

Ms. Pamela Matthews, Associate Dean
Mathematics Division

Dr. Elaine Johnson, Associate Dean
Literature and Composition Division

PRESENTATIONS

Pamela Matthews, Associate Dean
Mathematics Division

Tech Prep Video, Mt. Hood Community College

Presentation: Evergreen School District, Vancouver, Washington

Workshop/Presentation: National Tech Prep Conference, Atlanta, Georgia

Presentation: Northwest Math Conference, Portland, Oregon

Presentation: Central Valley High School, Spokane, Washington

Presenter/Workshop: MHCC Mathematics Teleconference and Workshop

Presentation: "Restructuring Education: Building a 21st Century Workforce" - Convention, Waco, Texas

Panel presentation at American Vocational Association, Nashville, Tennessee

Presentation: League of Innovation, New Orleans, Louisiana

Presentation: (with Dale Parnell) Oregon State University Telecourse, Salem, Oregon

Presentation: Teachers Teaching with Technology - Transit Conference - Fort Worth, Texas

Presentation: Western Regional NCTM Conference, San Francisco, California

Presentation: Sam Barlow High School, Gresham, Oregon

Workshop: Tech Prep Connection, New Hampshire

Presentation/Workshop: College of Sequoias, Fresno, California

Presentation: MHCC Forum on Educational Reform, Gresham, Oregon

Presentation: NTPN Conference, Baltimore, Maryland

Presentation/Workshop/Keynote Speaker: State Tech Prep Conference, Arizona

Presentation: Northwest Regional Tech Prep Conference, Seattle, Washington

Workshop: Mojave Community College, Arizona

PRESENTATIONS

Dr. Elaine Johnson, Associate Dean
Literature and Composition Division

Presentation: "Option for Change," New York Tech Prep Conference, Syracuse, New York

Presentation: Boeing Tech-Prep and Language Arts Conference, Mt. Hood Community College, Gresham, Oregon

Presentation: Central Valley High School, Spokane, Washington

Presentation: Washington Association of Occupational Educators' Fourth Annual Conference, Yakima Valley Community College, Yakima, Washington

Presentation: Systems Thinking Conference, Boston, Massachusetts

Presentation: Canadian Conference for Advanced Placement English Teachers, Edmonton, Alberta, Canada

Presentation: Chemeketa Community College Humanities Faculty, Salem, Oregon

Presentation/Workshop: Yakima School District Vocational-Technical Directors/Language Arts Faculty, Yakima, Washington

Presenter: "Tech Prep Associate Degree," Telecourse by Dale Parnell, Chemeketa Community College, Salem, Oregon

Presenter: Student Success Strategies Conference, Portland, Oregon

Participant: Washington Conference on Collaborative Learning, Bellevue, Washington

Presenter/Workshop: Keynote speaker and Workshop presenter for K-12 and Community College Faculty and Administrators, Spokane Community College, Spokane, Washington

Presenter: Barlow High School Faculty In-service, Gresham, Oregon

Presenter: National Tech-Prep Network, Baltimore, Maryland

Presenter: Northwest Regional Tech Prep Conference, Seattle, Washington

Presenter: Montana State-wide Tech Prep Conference, Great Falls, Montana

Presenter: Demonstration Site Presentation for Tech-Prep, Capital Area Partners for Educational Reform, Richmond, Virginia, at Mt. Hood Community College, Gresham, Oregon

Coordinator: Swinburne University, Australia, MHCC Teacher Exchange program

PRESENTATIONS

by Dr. Jack Miller

January 1993

Tech Prep Model Programs Meeting, Dallas, Texas

February 1993

Washington Regional Consortium, Walla Walla, Washington

April 1993

School to Work Transition Meeting, Washington, D.C.

AACC Conference, Portland, Oregon

May 1993

National Tech Prep Conference, Anaheim, California

June 1993

Education Service Center, Region XIII, Austin, Texas

July 1993

Tech Prep Pre-Conference Workshop, Portland, Oregon

CIA Summer Meeting and Leadership Institute, Bend, Oregon

August 1993

Regional Coordinators of Professional-Technical Education Deans' Retreat, Coos Bay, Oregon

September 1993

Fall National Tech Prep Network Conference, Atlanta, Georgia

October 1993

COMBASE Programs, Colorado Springs, Colorado

November 1993

Work Now and In The Future Conference, Portland, Oregon

Applied Academics Workshop, Waco, Texas

December 1993

American Vocational Association Convention, Nashville, Texas

January 1994

League of Innovation Conference, New Orleans, Louisiana

Colin County Community College Regional

Consortium Workshop, Dallas, Texas

February 1994

International Conference for Community College Chairs and Deans, Phoenix, Arizona

Student Success Conference, Portland, Oregon

March 1994

Gulf Coast Community College National Post-

Secondary Alliance Conference, Mississippi

April 1994

AACC Convention, Washington, D.C.

National Tech Prep Network Convention, Baltimore, Maryland

Northwest Regional Tech Prep Conference, Seattle, Washington

First Annual Montana Tech Prep Conference, Great Falls, Montana

MHCC Strawberry Short Course

May 1994

Celebration of Teaching Excellent, Austin, Texas

Appendix B

SUMMER NEWSLETTER OF THE
MT. HOOD NATIONAL TECH PREP DEMONSTRATION CENTER

NATIONAL TECH PREP DEMONSTRATION CENTER

NEWSLETTER

Michael Dillon, Dean
Community and Workforce Development
Marcia Dier, Coordinator, NTPDC, Writer/Editor
(503) 667-7394; FAX (503) 667-7679

Mt. Hood Community College
INSTRUCTIONAL SERVICES
26000 SE Stark Street
Gresham, Oregon 97030

GOODBYE, JACK

DR. JACK MILLER, past Director of the MHCC National Tech Prep Demonstration Center, retired June 1994. Dr. Miller began his career at Mt. Hood Community College in 1970 and served in various Associate Dean and Dean positions in different areas of the college during his tenure. He will begin his retirement years by vacationing in Mexico with his wife, Shirley. When asked what he planned to after that, Dr. Miller said that he currently has no plans to do anything but simply relax for at least the next year and get in a lot of boating.

Michael Dillon, Dean of Community and Workforce Development, has assumed responsibility as the Director of the MHCC National Tech Prep Demonstration Center for the remainder of the grant, which ends December 31, 1994. Michael will also be working with Oregon's Workforce 2000 project for the next year as well as meeting his other MHCC responsibilities.

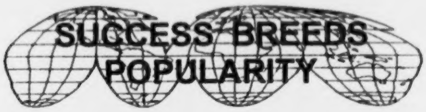
Marcia Dier, Coordinator for the MHCC National Tech Prep Demonstration Center, will continue with the Demonstration Grant to its conclusion in December. She is responsible for setting up visitations, disseminating materials, and spearheading the nine-national-demonstration-centers' cooperative booth at national conventions, such as at AVA in December, in response to the wishes of the U.S. Department of Education.

TECH PREP WORKSHOP . . . A GREAT SUCCESS!

THE MHCC NATIONAL Tech Prep Demonstration and the Mt. Hood Regional Cooperative Consortium co-sponsored a district-wide Tech Prep/Applied Academics workshop in April.

Fifty high school and community college administrators, instructors, and counselors attended the all-day workshop. The morning session was a general session in which an overview of the MHCC National Tech Prep Demonstration Center was presented. This was followed by a presentation on Applied Communications by Dr. Elaine Johnson, Associate Dean of the Literature and Composition Division, and a presentation on Single-Track Mathematics by Pamela Matthews, Associate Dean of the Mathematics Division. The afternoon's guest presenters then held a question-answer session.

The afternoon was composed of three concurrent workshops: one for administrators, one for instructors, and one for counselors. The presenters for each of these afternoon sessions were from Maryland. Dr. James Marlett, Principal of Calvert County High School in Prince Frederick spoke on "The High School Principal's Role in Implementing Tech Prep." Suzanne Kistler, a science teacher, and Marion Steinbach, a mathematics teacher, spoke on "Integrated Learning - A Teacher's Perspective." Pete Cevenini, Vocational Evaluator for Charles County Career & Technology Center, presented the topic, "Developing Comprehensive Support Services for All Tech Prep Students."



SUCCESS BREEDS POPULARITY

The Mt. Hood Consortium has hosted 48 groups, varying from one to fifty individuals, and sent information to over 1,797 sites, as shown below:

State	Visitations	Materials
Alaska	--	3
Alabama	--	5
Arkansas	--	11
Arizona	3	16
California	7	48
Colorado	2	16
Connecticut	--	1
Delaware	--	4
Florida	1	22
Georgia	--	10
Hawaii	2	5
Iowa	1	13
Idaho	--	3
Illinois	--	38
Indiana	--	9
Kansas	--	14
Kentucky	--	11
Louisiana	3	5
Massachusetts	--	10
Maryland	1	6
Maine	--	3
Michigan	--	12
Minnesota	1	15
Mississippi	--	7
Missouri	--	22
Montana	3	8
Nebraska	--	3
Nevada	1	6
New Hampshire	--	8
New Jersey	--	8
New Mexico	--	3
New York	--	16
North Carolina	1	8
North Dakota	--	5
Oklahoma	1	6
Ohio	--	19
Oregon	1	14
Pennsylvania	--	10
Rhode Island	1	4
South Carolina	1	8
South Dakota	--	7
Tennessee	--	16
Texas	2	41
Utah	--	7
Virginia	1	16
Vermont	--	3
Washington	6	25
Wisconsin	1	10
West Virginia	--	5
Wyoming	1	4
Washington DC	--	5

Country	Visitations	Materials
Palau	--	4
Yugoslavia	--	1
New Zealand	5	5
Australia	2	2
Virgin Islands	--	2
Micronesia & Guam	--	2
British Columbia	--	2
England	--	2
Canada	--	3

MT. HOOD CONSORTIUM IMPLEMENTS CAMS

IN THEIR ONGOING efforts to improve their educational systems and to meet the newly established Oregon State Department of Education guidelines, the Mt. Hood Consortium member schools are continuing with implementation of the Certificate of Advanced Mastery (CAM) programs.

Many of the high schools already have made significant strides in implementing several CAMs, but a lot of work lies ahead over the next several years to realize full implementation. To assist high schools in establishing CAMs, the Consortium plans to concentrate on staff development, which is an integral part of the CAM strategy.

The CAMs are occupational clusters and career paths that offer high school students a wide range of alternatives. Each CAM has, at its central core, an emphasis on integrated/applied academics to ensure that each students leaves high schools fully prepared to handle the demands of today's technological workplace.

The six designated CAM areas are Arts and Communications (programs related to the humanities and to the performing, visual, literary, and media arts); Business and Management (Programs related to the business environment); Health Services (programs related to the promotion of heath as well as the treatment of injuries, conditions, and disease); Human Resources (programs related to economic, political, and social systems); Industrial and Engineering Systems (programs related to the technologies necessary to design, develop, install, or maintain physical systems); and Natural Resource Systems (programs related to the environment and natural resources).

The benefits of the CAM-structured high school are many. It requires an interdisciplinary approach to education and reduces student tracking. It replaces the aimless shopping mall approach to class selection with a directed, sequenced course design. Ultimately, it involves students with the educational process and enables them to see how important it is, to their occupational futures, to have a sound basic education in mathematics, science, and verbal and written communications--all of which are interdisciplinary skills.

Appendix C

JOINT WORKSHOP ON CURRICULUM ARTICULATION IN MATHEMATICS

Joint Workshop on Curriculum Articulation in Mathematics

Centennial School District

◆

Mt. Hood Community College

◆

Reynolds School District

Mt. Hood Community College
ATO NSF Grant Project
October 18, 1994

Application-Based, Technology-Supported, One-Track (ATO) Mathematics Curriculum Grant Project

Funded by NSF
September 1994 - August 1997

> *"There are three aspects of instruction that must be considered in achieving a balanced, coherent mathematics program. First, there is the content students are expected to learn; second, the classroom teacher must possess both the content knowledge and the pedagogical know-how to involve students in learning that content; and finally, an assessment system must be in place that will determine to what extent students have developed mathematical power."* (NCTM Working Draft, *Assessment Standards for School Mathematics*, October, 1993)

The MHCC application-based, technology-supported, one-track mathematics curriculum (ATO) program is a model of a balanced, coherent mathematics program for all students in entry-level mathematics courses. It acknowledges the challenges of education reform in mathematics that are common to all schools that teach the mathematics addressed in the NCTM Standards.

The objectives of this project are:

OBJECTIVE 1: To develop and publish course materials for Levels II and III of ATO; a textbook for each level that fully integrates the use of technology, and a hands-on actiyities and real-world interdisciplinary applications supplement, each targeting the needs of community college students.

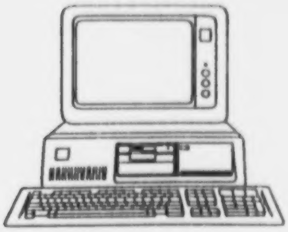
OBJECTIVE 2: To develop a framework for the ongoing staff development of community college adjunct mathematics faculty to enable them to effectively deliver a coherent mathematics curriculum.

OBJECTIVE 3: To develop in collaboration with middle schools and high schools in the community college district an articulated coherent mathematics curriculum that addresses content-based proficiency assessment strategies, and supports uniform implementation of the NCTM Standards in mathematics education.

CENTENNIAL SCHOOL DISTRICT MATHEMATICS TEACHERS

1. *We believe all students can be successful in mathematics.*
2. *We believe we should have a unified curriculum in the Centennial School District.*
3. *We believe we should embrace change in order to meet the needs of our students.*
4. *We believe all students should always have access to current technology.*
5. *We believe we should be accountable to the philosophy of the Centennial School District mathematics curriculum.*

April 1, 1993



Mathematics Division

PHILOSOPHY STATEMENT

Mt. Hood Community College, 1994

WE BELIEVE . . .

- *Interactive Mathematics is instrumental to success in 21st century education reform.*
- *Every motivated student can experience success in learning mathematics.*
- *Students better retain information if they participate in its discovery and application.*
- *Students learn best in context--that is, where they can relate what they are learning to their personal experience.*
- *Students should be given the opportunity to understand concepts (rather than just master techniques) in order to transfer this knowledge.*
- *Students should have access to calculators and other technology to empower them in their learning and to enable them to relate what they are learning to the way it is experienced in the workplace.*
- *All learning styles should be considered in teaching mathematics, and evaluation of student performance should incorporate this diversity.*
- *Learning and appreciating mathematics is a life-long experience.*
- *The real world should be simulated in the educational setting by incorporating team learning experiences.*

Reynolds School District

Mathematics Team

PHILOSOPHY STATEMENT

(May 17, 1994)

WE BELIEVE...

- *Individuals and their ideas must be recognized, respected, and valued in all classrooms.*
- *Every motivated student can experience success in learning mathematics.*
- *Presenting mathematics in a variety of ways is beneficial to all students and better meets individual needs.*
- *As teachers of mathematics, we must allow students the opportunity to discover and construct their own understanding of mathematical concepts.*
- *Students must actively participate in the learning process in order to make mathematical connections.*
- *Mathematical concepts that are integrated with real life applications and/or personal experiences become more valuable and are consequently better retained.*
- *Teachers and students need to recognize that disequilibrium is a part of learning and as a result they should celebrate setbacks as well as successes.*
- *The calculator is an essential tool for learning mathematics, therefore, students should not be denied use of calculators.*
- *The use of current technology enhances the presentation and learning of mathematical concepts and allows access to topics which otherwise might not be possible to investigate.*
- *Mathematics impacts all areas of human endeavors and offers to students special opportunities to discover the power of thought.*
- *We believe all teachers should respect each other by accepting both personal and professional diversity, and participate in a strong support network within our mathematics community.*

WHAT IS INTERACTIVE MATHEMATICS AT MT. HOOD COMMUNITY COLLEGE?

Mathematics at MHCC is interactive in the following three ways:

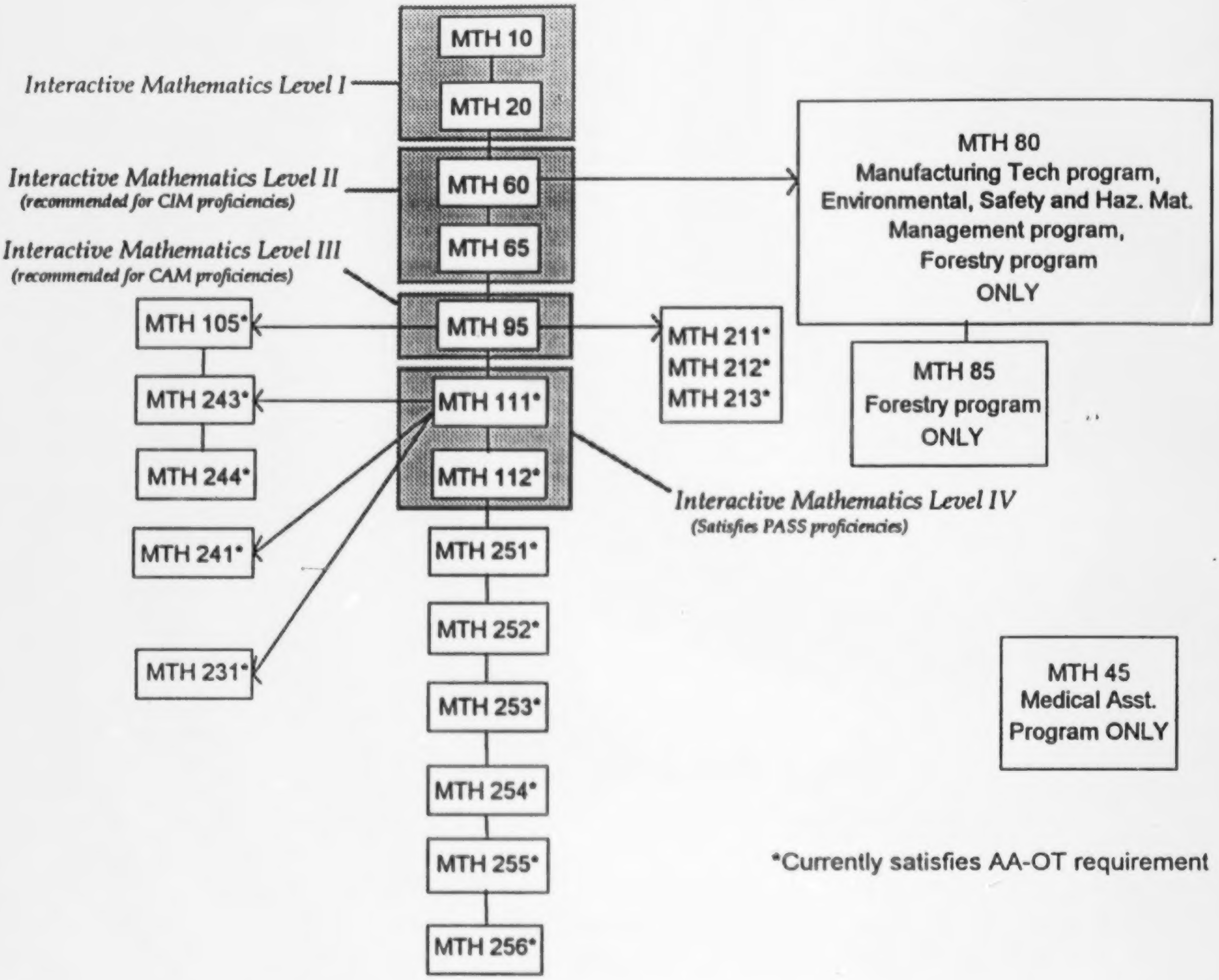
- Students are actively involved with other students and the instructor in their learning of mathematics.
- Algebra, geometry, probability, data analysis, and statistics are integrated in each level of interactive mathematics.
- Applications from other disciplines are incorporated to establish a strong connection between mathematics and the real world.

To facilitate the learning of mathematics as prescribed by the NCTM Standards and the SCANS documents, an interactive mathematics class includes the following components:

- ***Problem solving activities*** provide students the opportunity to develop and apply a variety of strategies to solve problems, verify and interpret results with respect to the original problem situation, generalize solutions and strategies to new problem situations. Through this experience students acquire confidence in using mathematics meaningfully and are able to formulate problems from situations within and outside of mathematics.
- An emphasis on ***oral and written communication*** enables students to reflect on and clarify their own thinking about mathematical ideas and situations. Through communication, students learn to appreciate the value of mathematical language and notation.
- The ***connection of mathematics to the real world*** is seen as students apply mathematical thinking and modeling to solve problems that arise in disciplines, such as art, music, psychology, science, and business. This leads students to value the role of mathematics in our culture and ever-changing technological society.
- The ***use of technology*** provides the student with alternative ways to experience mathematics: numerically, graphically, and algebraically. Technology allows the modeling of realistic problem situations without the tedium of "number crunching".
- ***Team activities and projects*** support cooperative learning, and provide the opportunity to develop team skills necessary to work in the real world.
- ***Guided discovery learning activities*** help the student take responsibility for his/her learning and develop a mechanism to "learn how to learn." By investigating patterns, exploring concrete, pictorial, and graphical models students create their own understanding of mathematical concepts.
- By integrating algebra, geometry, probability, data analysis, and statistics, in each of the four interactive levels, students will see ***mathematics as an integrated whole***.

MATHEMATICS DIVISION
SEPTEMBER 1994

MHCC ATO MATHEMATICS CURRICULUM
BACCALAUREATE PREP/TECH PREP COURSE SEQUENCE


MTH 10
MTH 20
Interactive Mathematics Level I
Interactive Mathematics Level II
(recommended for CIM proficiencies)
MTH 60
MTH 65
MTH 80
Manufacturing Tech program, Environmental, Safety and Haz. Mat. Management program, Forestry program ONLY
Interactive Mathematics Level III
(recommended for CAM proficiencies)
MTH 105*
MTH 95
MTH 211*
MTH 212*
MTH 213*
MTH 85
Forestry program ONLY
MTH 243*
MTH 111*
MTH 244*
MTH 112*
Interactive Mathematics Level IV
(Satisfies PASS proficiencies)
MTH 241*
MTH 251*
MTH 252*
MTH 231*
MTH 253*
MTH 254*
MTH 255*
MTH 256*
MTH 45
Medical Asst. Program ONLY

*Currently satisfies AA-OT requirement

★ • MTH 10	Interactive Mathematics IA
★ • MTH 20	Interactive Mathematics IB
✓ MTH 60	Interactive Mathematics IIA
✓ MTH 65	Interactive Mathematics IIB
✓ MTH 80, 85	Technical Mathematics I, II
✓ MTH 95	Interactive Mathematics III (formerly Intermediate Algebra)
♦ MTH 105	Introduction to Comtemporary Mathematics
✓ MTH 111	Pre-Calculus I: Elementary Functions
✓ MTH 112	Pre-Calculus II: Trigonometry & Analytical Geometry
♦★ • MTH 211, 212, 213	Fundamentals of Elementary Mathematics
♦ MTH 231	Discrete Mathematics
♦✓ MTH 241	Elementary Calculus
♦ • MTH 243	Introduction to Probability & Statistics I
♦ • MTH 244	Statistics II
♦ • MTH 251, 252, 253	Differential and Integral Calculus
♦ • MTH 254, 255	Vector Calculus I, II
♣ • MTH 256	Applied Differential Equations

KEY

- ★ Course requires at least a scientific calculator (TI-34 recommended)
- ♦ Computer lab included (fee required)
- ♣ Computer lab may be required
- ✓ Graphing calculator is required (TI-82 recommended)
- • Graphing calculator may be used (TI-82 recommended)

BEST COPY AVAILABLE

9/94

NCTM EVALUATION STANDARDS FOR GRADES 5-12

GENERAL ASSESSMENT

Δ *STANDARD 1: ALIGNMENT*

Methods and tasks for assessing students' learning should be aligned with the curriculum's-

- goals, objectives and mathematical content;
- relative emphasis given to various topics and processes and their relationships;
- instructional approaches and activities, including the use of calculators, computers and manipulative.

Δ *STANDARD 2: MULTIPLE SOURCES OF INFORMATION*

Decisions concerning students' learning should be made on the basis of a convergence of information obtained from a variety of sources. These sources should encompass tasks that-

- demand different kinds of mathematical thinking;
- present the same mathematical concept or procedure in different contexts, formats, and problem situations.

Δ *STANDARD 3: APPROPRIATE ASSESSMENT METHODS AND USES*

Assessment methods and instruments should be selected on the basis of—

- the type of information sought;
- the use to which the information will be put;
- the development and maturity of the student.

The use of assessment data for purposes other than those intended is inappropriate.

STUDENT ASSESSMENT

Δ *STANDARD 4: MATHEMATICAL POWER*

The assessment of students' mathematical knowledge should yield information about their-

- ability to use mathematical language to communicate ideas;
- ability to reason and analyze;
- knowledge and understanding of concepts and procedures;
- disposition toward mathematics;
- understanding of the nature of mathematics;
- integration of these aspects of mathematical knowledge.

Δ *STANDARD 5: PROBLEM SOLVING*

The assessment of students' ability to use mathematics in solving problems should provide evidence that they can—

- formulate problems;
- apply a variety of strategies to solve problems;
- solve problems;
- verify and interpret results;
- generalize solutions.

Δ *STANDARD 6: COMMUNICATION*

The assessment of students' ability to communicate mathematics should provide evidence that they can—

- express mathematical ideas by speaking, writing, demonstrating, and depicting them visually;
- understand, interpret, and evaluate mathematical ideas that are presented in written, oral, or visual form;
- use mathematical vocabulary, notation, and structure to represent ideas, describe relationships and model situations.

Δ *STANDARD 7: REASONING*

The assessment of students' ability to reason mathematically should provide evidence that they can-

- use inductive reasoning to recognize patterns and form conjectures;
- use proportional and spatial reasoning to solve problems;
- use deductive reasoning to verify conclusions, judge the validity of arguments, and construct valid arguments.
- analyze situations to determine common properties and structures;
- appreciate the axiomatic nature of mathematics.

Δ *STANDARD 8: MATHEMATICAL CONCEPTS*

The assessment of students' knowledge and understanding of mathematical concepts should provide evidence that they can—

- label, verbalize, and define concepts;
- identify and generate examples and nonexamples;
- use models, diagrams, and symbols to represent concepts;
- translate from one mode of representation to another;
- recognize the various meanings and interpretations of concepts;
- identify properties of a given concept and recognize conditions that determine a particular concept;
- compare and contrast concepts.

in addition, assessment should provide evidence of the extent to which students have integrated their knowledge of various concepts.

Δ *STANDARD 9: MATHEMATICAL PROCEDURES*

The assessment of students' knowledge of procedures should provide evidence that they can—
- recognize when a procedure is appropriate;
- give reasons for the steps in a procedure;
- reliably and efficiently execute procedures;
- verify the results of procedures empirically (e.g. using models) or analytically;
- recognize correct and incorrect procedures;
- generate new procedures and extend or modify familiar ones;
- appreciate the nature and role of procedures in mathematics.

Δ *STANDARD 10: MATHEMATICAL DISPOSITION*

The assessment of students' mathematical disposition should seek information about their—
- confidence in using mathematics to solve problems, to communicate ideas, and to reason;
- flexibility in exploring mathematical ideas and trying alternative methods in solving problems;
- willingness to persevere in mathematical tasks;
- interest, curiosity, and inventiveness in doing mathematics;
- inclination to monitor and reflect on their own thinking and performance;
- valuing of the application of mathematics to situations arising in other disciplines and everyday experience;
- appreciation of the role of mathematics in our culture and its value as a tool and as a language.

PROGRAM ASSESSMENT

Δ *STANDARD 11: INDICATORS FOR PROGRAM EVALUATION*

Indicators of a mathematics program's consistency with the Standards should include-
- student outcomes;
- program expectations and support;
- equity for all students;
- curriculum review and change.

In addition, indicators of the program's match to the Standards should be collected in the areas of curriculum, instructional resources, and forms of instructions.

Δ *STANDARD 12: CURRICULUM AND INSTRUCTIONAL RESOURCES*

In an evaluation of a mathematics program's consistency with the Curriculum Standards, the examination of curriculum and instructional resources should focus on-
- goals, objectives, and mathematical content;
- relative emphases of various topics and processes and their relationships;
- instructional approaches and activities;
- articulation across grades;
- assessment methods and instruments;
- availability of technological tools and support materials.

Δ *STANDARD 13: INSTRUCTION*

In an evaluation of a mathematics program's consistency with the Curriculum Standards, instruction and the environment in which it takes place should be examined, with special attention to-
- mathematical content and its treatment;
- relative emphases assigned to various topics and processes and the relationship among them;
- opportunities to learn;
- instructional resources and classroom climate;
- assessment methods and instruments;
- the articulation of instruction across grades.

Δ *STANDARD 14: EVALUATION TEAM*

Program evaluations should be planned and conducted by-
- individuals with expertise and training in mathematics education;
- individuals with expertise and training in program evaluation;
- individuals who make decisions about the mathematics program;
- users of the information form the evaluation.

NCTM Standards for Teaching Mathematics

SIX STANDARDS FOR TEACHING MATHEMATICS UNDER FOUR CATEGORIES:

- *Tasks* are the projects, questions, problems, constructions, applications, and exercises in which students engage. They provide the intellectual contexts for students' mathematical development.
- *Discourse* refers to the ways of representing, thinking, talking, and agreeing and disagreeing that teachers and students use to engage in those tasks.
- *Environment* represents the setting for learning. It is the context in which the tasks and discourse are embedded; it also refers to the use of materials and space.
- *Analysis* is the systematic reflection in which teachers engage. It entails the ongoing monitoring of classroom life—how well the tasks, discourse, and environment foster the development of every student's mathematical literacy and power.

ASSUMPTIONS

1. ***The goal of teaching mathematics is to help all students develop mathematical power.*** Teachers must help every student develop conceptual and procedural understandings of number, operations, geometry, measurement, statistics, probability, functions, and algebra and the connections among ideas. They must engage all students in formulating and solving a wide variety of problems, making conjectures and constructing arguments, validating solutions, and evaluating the reasonableness of mathematical claims.
2. ***WHAT students learn is fundamentally connected with HOW they learn it.*** The goal of developing students' mathematical power requires careful attention to pedagogy as well as to curriculum.
3. ***All students can learn to think mathematically.*** Every student can—and should—learn to reason and solve problems, to make connections across a rich web of topics and experiences, and to communicate mathematical ideas.
4. ***Teaching is a complex practice and hence not reducible to recipes or prescriptions.*** p 20

TASKS

The mathematics tasks in which students engage—projects, problems, constructions, applications, exercises, and so on—and the materials with which they work frame and focus students' opportunities for learning mathematics in school. Tasks provide the stimulus for students to think about particular concepts and procedures, their connections with other mathematical ideas, and their applications to real-world contexts. Good tasks can help students to develop skills in the context of their usefulness. Tasks also convey messages about what mathematics is and what doing mathematics entails. Tasks that require students to reason and to communicate mathematically are more likely to promote their ability to solve problems and to make connections. Such tasks can illuminate mathematics as an intriguing and worthwhile domain of inquiry. A central responsibility of teachers is to select and develop worthwhile tasks and materials that create opportunities for students to develop these kinds of mathematical understandings, competence, interests, and dispositions.

p 24

Δ *STANDARD 1: WORTHWHILE MATHEMATICAL TASKS*

The teacher of mathematics should pose tasks that are based on—

- sound and significant mathematics;
- knowledge of students' understandings, interests, and experiences;
- knowledge of the range of ways that diverse students can learn mathematics;

and that

- engage student's intellect;
- develop students' mathematical understandings and skills;
- stimulate students to make connections and develop a coherent framework for mathematical ideas;
- call for problem formulation, problem solving, and mathematical reasoning;
- promote communication about mathematics;
- represent mathematics as an ongoing human activity;
- display sensitivity to, and draw on, students' diverse background experiences and dispositions;
- promote the development of all students' dispositions to do mathematics. p 25

DISCOURSE

The discourse of a classroom—the ways of representing, thinking, talking, agreeing and disagreeing—is central to what students learn about mathematics as a domain of human inquiry with characteristic ways of knowing. The discourse is shaped by the tasks in which students engage and the nature of the learning environment; it also influences them.

- Discourse entails fundamental issues about knowledge.
- Students must talk, with one another as well as in response to the teacher.
- The teacher's role is to initiate and orchestrate this kind of discourse and to use it skillfully to foster student learning. p 34

Δ *STANDARD 2: THE TEACHER'S ROLE IN DISCOURSE*

The teacher of mathematics should orchestrate discourse by—

- posing questions and tasks that elicit, engage, and challenge each student's thinking;
- listening carefully to students' ideas;
- asking students to clarify and justify their ideas orally and in writing;
- deciding what to pursue in depth from among the ideas that students bring up during a discussion;
- deciding when and how to attach mathematical notation and language to students' ideas;
- deciding when to provide information, when to clarify an issue, when to model, when to lead, and when to let a student struggle with a difficulty;
- monitoring students' participation in discussions and deciding when and how to encourage each student to participate. p 35

Δ *STANDARD 3: STUDENTS' ROLE IN DISCOURSE*

The teacher of mathematics should promote classroom discourse in which students—

- listen to, respond to, and question the teacher and one another;
- use a variety of tools to reason, make connections, solve problems, and communicate;
- initiate problems and questions;
- make conjectures and present solutions;
- explore examples and counterexamples to investigate a conjecture;
- try to convince themselves and one another of the validity of particular representations, solutions, conjectures, and answers;
- rely on mathematical evidence and argument to determine validity. p 45

Δ *STANDARD 4: TOOLS FOR ENHANCING DISCOURSE*

The teacher of mathematics, in order to enhance discourse, should encourage and accept the use of—

- computers, calculators, and other technology;
- concrete mathematics used as models;
- pictures, diagrams, tables, and graphs;
- invented and conventional terms and symbols;
- metaphors, analogies, and stories;
- written hypotheses, explanations, and arguments;
- oral presentations and dramatizations. p 52

ENVIRONMENT

The mathematics teacher is responsible for creating an intellectual environment in which serious engagement in mathematical thinking is the norm, for the environment of the classroom is foundational to what students learn. More than just a physical setting with desks, bulletin boards, and posters, the classroom environment forms a hidden curriculum with messages about what counts in learning and doing mathematics: Neatness? Speed? Accuracy? Listening well? Being able to justify a solution? Working independently? If we want students to learn to make conjectures, experiment with alternative approaches to solving problems, and construct and respond to others' mathematical arguments, then creating an environment that fosters these kinds of activities is essential. p 56

Δ *STANDARD 5: LEARNING ENVIRONMENT*

The teacher of mathematics should create a learning environment that fosters the development of each student's mathematical power by—

- providing and structuring the time necessary to explore sound mathematics and grapple with significant ideas and problems;
- using the physical space and materials in ways that facilitate students' learning of mathematics;
- providing a context that encourages the development of mathematical skills and proficiency;
- respecting and valuing students' ideas, ways of thinking, and mathematical dispositions; and by consistently expecting and encouraging students to—
- work independently or collaboratively to make sense of mathematics;
- take intellectual risks by raising questions and formulating conjectures;
- display a sense of mathematical competence by validating and supporting ideas with mathematical argument. p 57

ANALYSIS

The central questions for which teachers must be responsible is, "How well are the tasks, discourse, and environment working to foster the development of students' mathematical literacy and power?"

Trying to understand as much as possible about the effects of the mathematics classroom on each student is essential to good teaching. Teachers must monitor classroom life using a variety of strategies and focusing on a broad array of dimensions of mathematical competence, as outlined in the *Curriculum and Evaluation Standards for School Mathematics*. What do students seem to understand well, what only partially? What connections do they seem to be making? What mathematical dispositions do they seem to be developing? How does the group work together as a learning community making sense of mathematics? What teachers learn from this should be a primary source of information for planning and improving instruction in both the short and the long term. p 62

Δ ***STANDARD 6: ANALYSIS OF TEACHING AND LEARNING***

The teacher of mathematics should engage in ongoing analysis of teaching and learning by—

- observing, listening to, and gathering other information about students to assess what they are learning;
- examining effects of the tasks, discourse, and learning environment on students' mathematical knowledge, skills, and dispositions;

in order to—

- challenge and extend students' ideas;
- adapt or change activities while teaching;
- make plans, both short-and long-range;
- describe and comment on each student's learning to parents and administrators, as well as to the students themselves. p 63

Appendix D

EVALUATION OF PROFESSIONAL TECHNICAL PROGRAMS IN THE MT. HOOD REGIONAL COOPERATIVE CONSORTIUM

Prepared by

The Office of Research, Planning, and Computer Services
Mt. Hood Community College

MT. HOOD COMMUNITY COLLEGE

TO: Dan Walleri, Director
Research, Planning and Computer Services

DATE: April 1, 1994

FR: JoyLynn Woodard
Research Specialist

CC: Michael Dillon
Jack Miller
Bob Wesley
Tom Owens
Nancy Conrath
Marilyn Kennedy
✓Marcia Dier

RE: GRADUATING SENIORS IN ARTICULATED TECH PREP PROGRAMS AT MHCC

Last May, 11th and 12th grade professional technical education students in the consortium were surveyed. They were asked whether they planned to attend Mt. Hood Community College after graduating from high school. The following data shows last year's graduating seniors that indicated an intent to attend MHCC, those who actually entered Mt. Hood, and those who enrolled in an articulated program between the high school and MHCC (none of the 11th graders were in attendance at MHCC.)

	Total 11th	Total 12th	# 12th Attend MHCC	# 12th Grads in Prof/Tech*
CENTENNIAL	5	71	16	3
GRESHAM	14	79	32	4
CORBETT	19	21	7	0
PARKROSE	26	51	19	1
DAVID DOUGLAS	70	121	42	3
REYNOLDS	44	117	56	12
SAM BARLOW	64	127	55	3
SANDY	29	55	18	4
OTHER	4	2	1	0

*in articulated prof/tech program (the particular high school and MHCC)

JW/jw (RES - C23839)

2+2

A STUDY OF HIGH SCHOOL STUDENTS WHO TRANSCRIPTED CREDITS EARNED IN ARTICULATED COLLEGE PROFESSIONAL TECHNICAL PROGRAMS

Prepared by

Nancy L. Conrath
Higher Educational Institutional Research Services

HEIRS

In Cooperation with

The Office of Research, Planning and Computer Services
Mt. Hood Community College

And the

Mt. Hood Regional Cooperative Consortium

September 21, 1994

A STUDY OF HIGH SCHOOL STUDENTS WHO TRANSCRIPTED CREDITS EARNED IN ARTICULATED COLLEGE PROFESSIONAL TECHNICAL PROGRAMS

Table of Contents

Executive Summary Page 1

Introduction 3

Characteristics and Motives 4

  Characteristics 4
  Motives 6

Enrollment Patterns 7

  Major 7
  Persistence 8
  High School of Origin 8

Performance 8

  College Placement 10
  Hours Earned 10
  GPA 12

Conclusions 13

List of Tables 15

References 23

List of Figures

Figure 1: Characteristics of Students 5

Figure 2: Motives of Students 5

Figure 3: Choice of Major Type by Students 9

Figure 4: High School Origin of Students 9

Figure 5: College Placement in Guided Studies 11

Figure 6: Cumulative Hours Earned 11

Figure 7: Grade Point Average (GPA) Earned 11

A STUDY OF HIGH SCHOOL STUDENTS
WHO TRANSCRIPTED CREDITS EARNED IN ARTICULATED
COLLEGE PROFESSIONAL TECHNICAL PROGRAMS

Executive Summary

This is a report of studies concerning two-plus-two students who requested transcripts of credits earned in high school technical preparatory (tech prep) courses in programs articulated with Mt. Hood Community College (MHCC) professional technical programs. The primary data source is a file of students requesting transcripts during the six-year period 1987-88 through 1992-93, to which a sample of other students were added for comparison purposes. The file includes data on student characteristics, motives, enrollment patterns and performance indicators. Additional comparison data were drawn from student and enrollment records or other studies, as appropriate.

Overall analysis was done by the consultant, Nancy Conrath, with an initial report of the same title submitted in June. A study limited to students in the data file earning twelve or more units was conducted as well by Thomas Owens, Senior Associate in the Education and Work Program, Northwest Regional Educational Laboratory. Dan Walleri, Director of MHCC's Office of Research, Planning and Computer Services, also contributed advice, interpretive insight and comparison data. This report combines and summarizes findings from the three sources.

The data file included 436 students who requested and actually did transcript credits, called *transcripters,* 83 students who requested but did not follow through to actually transcript, called *non-transcripters,* and 1,114 other MHCC students, called the *sample*. The number of students requesting transcripts is lower than that reported by the Consortium because the count is unduplicated across the six years of the study.

A straightforward comparison of the three groups shows transcripters performing at nearly the same or higher levels than the sample in placement tests, grade point average (GPA) and accumulation of credits. Non-transcripters earned more credits but did less well than the other two groups in placement and grades. Except for an unusually high proportion of females among transcripters, indicating more transcription from programs with female majorities, student characteristics and enrollment motives were predictable. Two-plus-two students were younger, less well educated and less often employed than sample students; degree and job goals were more important to them, and they were much more often from Consortium high schools than sample students. *A majority of transcripters and a plurality of non-transcripters, however, did not subsequently enroll in the College.*

While the percentage of transcripters who later enrolled in the College was somewhat higher than for all high school students, at 46% compared to an average of 30%, *just 14% of them enrolled in a professional technical program.* The proportions were higher for the smaller group of non-transcripters, at 71% of students who subsequently enrolled and 23% who elected a professional technical major.

Controlling for subsequent enrollment changed performance data. College level placement declined for transcripters, falling below the sample in reading and writing and on a par in math; GPA dropped substantially below the sample. Non-transcripters did somewhat better in placement, surpassing the sample in math, but not as well in GPA. Cumulative hours earned were higher for both two-plus-two groups when controlling for subsequent enrollment at the College, and were considerably higher than the sample.

In the Owens study, limiting analysis to those earning 12 hours or more further reduced the performance of transcripters compared to the sample, except for cumulative hours earned. In this study, transcripters who chose one of several lower-division majors were compared to those selecting professional technical majors. The lower-division majors performed better than the professional technical majors, but less well than the comparison sample, except in math placement.

The significance of controlling for subsequent College enrollment and for a minimum of 12 hours earned is that these students can be considered matriculants, clearly moving from Consortium high schools to College programs. These matriculating students earned more credits, but were less well prepared than all two-plus-two students or the sample.

The majority of all students enrolled for just one year, but the percentage was much higher for the sample than for two-plus-two students. The number of transcripters and non-transcripters earning credits, and the number of hours earned per student has increased steadily over the years of the study.

First year enrollment for transcripters was low the first two years of the study, up substantially the third through fifth years, and down by half the last year.

Results of these studies carry a mixed message. On the positive side, transcription rose and the qualifications of students were on a par with or better than for all College students. On the down side, fewer than half of the transcripters later enrolled at MHCC; scarcely more than a trickle chose professional technical programs, and the more serious students, taking on greater course loads, were less well prepared. Further research and planning efforts need to include a review of articulation processes, analysis of the characteristics of successful articulation programs, and some probe into the realistic career motives and identification of tech prep students.

The Consortium is moving into a new era with the high school Certificate of Advanced Mastery (CAM) structure. High school students currently evidence considerable ambivalence in their career choices. How student options or career directions will change and what role two-plus-two programs will play in the new structure is uncertain. Successful articulation of students from high school to college to beginning careers will be an important goal. With continuing Consortium support, and new curricular development, more strength in the articulated enrollment of goal-directed, able students in two-plus-two programs can be encouraged and facilitated.

A STUDY OF HIGH SCHOOL STUDENTS WHO TRANSCRIPTED CREDITS EARNED IN ARTICULATED COLLEGE PROFESSIONAL TECHNICAL PROGRAMS

Introduction

The Mt. Hood Regional Cooperative Consortium has for some time actively encouraged the development of articulation agreements between high school technical preparatory and the college professional technical programs. Advantages of articulated, or "two-plus-two" programs are the reduction of duplication in coursework, and better preparation for college-level study. High school students earn college credit for satisfactorily completing articulated courses. The Consortium's 1993 Annual Report, *Benchmarks & Milestones,* indicates that the duplicated number of students who requested transcripts from high school to Mt. Hood Community College (MHCC) rose from 41 in 1987-88 to 329 in 1992-93, a seven-fold increase.

The Office of Research, Planning and Computer Services at MHCC identified 436 unduplicated high school students who had transcripted credits to the College over the six-year period 1987-88 through 1992-93, and another 83 who had requested transcripts but had not followed up to actually process the transcript. These students, mostly from the eight high schools in the Consortium, were clearly two-plus-two students who enrolled in at least one high school course in a tech prep program which was articulated with an MHCC professional technical program. While other high school students were also enrolled in articulated programs, they either did not request a transcript at all or they transcripted to a college other than MHCC. With the use of student identification across institutions recently proscribed in Oregon, the 519 high school two-plus-two students on record at MHCC provided the Office with an alternate means of studying the characteristics of these students and their subsequent performance. In order to place the data on two-plus-two students in context, a comparison sample was drawn of all other students enrolled in the same major and first term of attendance. The resulting high number proved to be unwieldy and was reduced to 1,114 cases by a random sample.

The Consortium had two external evaluators working on separate projects that could be used for the two-plus-two study: Nancy Conrath, an external contractor working on the Quality Assurance pilot project for the Consortium under a grant from the Office of Professional and Technical Education (OPTE), and Thomas Owens, from the Northwest Regional Educational Laboratory, working on a federally funded evaluation project. Dan Walleri, Research Office Director, met with Conrath and Owens to select data elements to be included in the file and to discuss research possibilities. Conrath did the general overview of the data, while Owens focused on students earning 12 or more credits. In this report, highlights of general data results will be presented in the following categories: student characteristics and motives, enrollment patterns and performance. Results of the Owens study will be brought in as they relate to these categories. Data provided by the Research Office and from other studies will also be introduced as they relate to the topics under discussion.

Data for the general overview were broken down by *transcripters*, those who actually transcripted credit, *non-transcripters*, those who requested but did not transcript credit, and the *sample*, those who did not request or transcript credit. In the Owens study, data for students earning 12 credits or more were broken down by transcripters in lower-division majors, who were called Professional Technical Education 1 students or *PTE1;* by transcripters in professional technical majors, called *PTE2;* and by the *sample.*

Characteristics and Motives

Characteristics. It was no surprise that two-plus-two students were younger, with less education and employment than the sample. Virtually all of them were 13 to 25 years of age in 1993, compared to 29% of the sample. Most transcripters were 18-20 years, at 67%, while most non-transcripters were 21-25, at 74%, suggesting that more recent two-plus-two students not only followed up in processing their transcript requests more often, but increased in total number. In the Owens study of those earning 12 or more units, differences in age were not as marked. While nearly all PTE1 and PTE2 students were 25 years of age or less, 81% of the sample were also in that age range, although with fewer in the 17-21 year range.

Educational level was less than a high school education for a majority of 53% of transcripters, because so many of them did not later attend MHCC. A 51% majority of non-transcripters were high school graduates – as well as 36% of transcripters. While a plurality of 41% of the sample were also high school graduates, 15% had a bachelor's degree or higher. Nine percent of both transcripters and non-transcripters had two to three years of college but no degree; scarcely any higher educational level was reported.

Part-time employment was listed for 67% of transcripters and 64% of non-transcripters, compared to 23% of the sample. Half the sample worked full-time compared to 13% of transcripters and 20% of non-transcripters.

There was little difference in ethnicity among the three groups or in the Owens subsample; the percentage of whites ranged from 88% to 91%. Whites were 92% of all credit and of all professional technical students at MHCC in 1992-93.

Fully unexpected were differences in the three groups by sex. Among transcripters, 79% were female, compared to 42% of non-transcripters and 51% for the sample. In 1992-93, total tech prep enrollment in regional high schools was 54% male, 45% female, but ratios varied considerably by programs. The high percentage of females among transcripters represents differences in the processing of transcripts by programs, with more emphasis and/or assistance in programs with female majorities, such as Office Systems and Hospitality/Tourism. In the Owens study, however, females were majorities in all groups, at 65% for the sample, 70% for PTE1 and 85% for PTE2 students. See Figure 1, opposite, and Tables 1 through 4, page 17.

Figure 1: Characteristics of Students

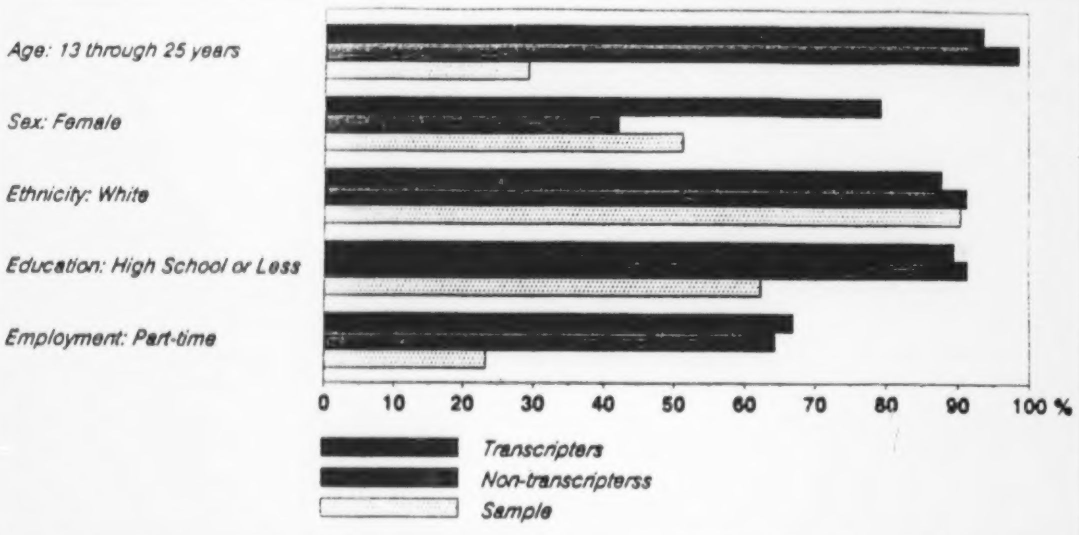
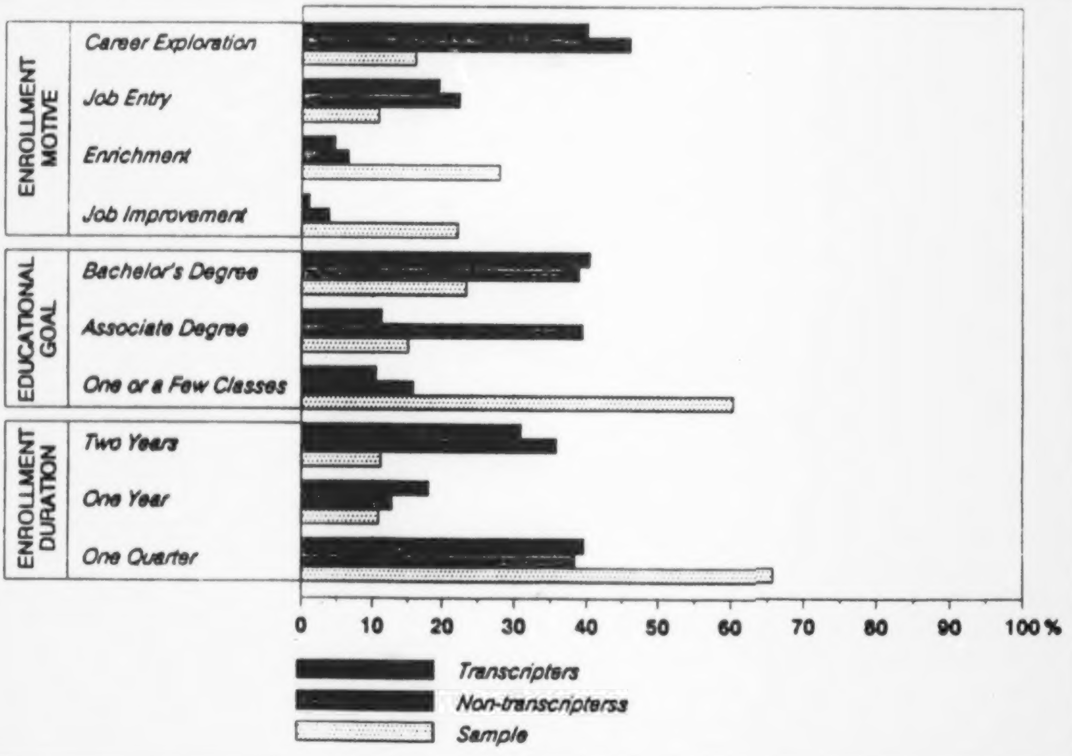


Figure 2: Motives of Students



BEST COPY AVAILABLE

Motives. Differences among the three groups in enrollment purposes and goals, and in the intended duration of enrollment, could be anticipated. The most frequent purpose for enrollment among two-plus-two students was to explore a career, at 40% of transcripters and 46% of non-transcripters, compared to 16% for the sample. Another 20% of transcripters and 22% of non-transcripters were interested in preparing to get a job, contrasting with 11% among sample students. The most often cited reason for enrolling among sample students was for enrichment or personal improvement, at 28%, with improving in a job at 22%. Enrichment or job improvement held little interest for two-plus-two students. Some "other" reason was fairly high for all groups, at 25% for transcripters, 13% for the non-transcripters and 15% for the sample.

The educational goal for the largest share of two-plus-two students was a bachelor's degree, at 41% for transcripters and 40% for non-transcripters. A substantial portion of these students also opted for a two-year degree, at 27% for transcripters and 29% for non-transcripters. The majority of the sample wanted only to take one or a few classes, at 60%; the next most frequent goal was to get a bachelor's degree, at 15%, much below the interest of two-plus-two students.

In the Owens study of students earning 12 units or more, enrollment purposes and educational goals for the sample and for the two PTE groups were quite different. Career exploration was the enrollment purpose for 62% of the PTE1 group enrolled in lower-division majors, 30% of PTE2 professional technical students and 41% of the sample. The most common purpose for PTE2 students was to get a job, at 43%; this purpose was most important to just 17% of PTE1 students and 16% of the sample. Earning a bachelor's degree was the educational goal for 70% of the PTE1 and 58% of the sample, but only 15% of PTE2 students. The latter were more interested in a two-year degree, at 79%; this goal was reported by just 30% of PTE1 students and 23% of the sample. In these comparisons, the PTE2 group was clearly the most oriented to job entry while the PTE1 group was most interested in transfer and a four-year degree. The Owens sample group generally fell between these polarities, with much less interest in enrichment or enrollment in one or a few classes than for the overall sample.

The duration of expected enrollment also contrasted sharply between two-plus-two and sample students. Sixty-four percent of the sample wanted only to enroll one quarter, while about 40% of two-plus-two students expected enrollment to end with just one term. Two years of enrollment was intended by 31% of transcripters and 36% of non-transcripters, compared to 11% of the sample, while 18% of transcripters and 13% of non-transcripters expected to enroll one year, compared to 11% of the sample. See Figure 2, previous page, and Tables 5 through 7, pages 18 and 19.

These data support the notion that two-plus-two students anticipate the need for further study and credentials, while for the older, already-working sample students, further education is more often regarded as personal enrichment and job enhancement. Fairly high interest in the two-year degree among two-plus-two students is also significant. When comparisons are limited to those with 12 or more hours, lower-division and sample students more often sought a four-year degree, while professional technical students were more clearly interested in job entry and a two-year degree.

Enrollment Patterns

The three enrollment factors studied were choice of major, persistence in year-to-year enrollment, and high school of origin. Major choices and persistence were fairly consistent with the motives discussed above. The high school of origin identifies Consortium schools and their shares of students.

Major. The major code "high school student" was reported for 59% of transcripters and 30% of non-transcripters, compared to 12% of the sample. This code is typically used for students whose primary enrollment is in high school, *e.g.,* transcripters, and is changed when the student enrolls at MHCC and selects a major. This indicates that most transcripters and a plurality of non-transcripters did not later enroll at the College.

A professional technical major was selected by 15% of transcripters and 24% of non-transcripters, compared to 2% of the sample. A lower-division major was selected by 13% of transcripters and 24% of non-transcripters, compared to 5% of the sample. The dominant major among sample students was adult enrichment, at 56%, followed by general studies at 24%. Enrichment was a major of just 2% of transcripters and 4% of non-transcripters, while general studies was chosen by 9% of transcripters and 16% of non-transcripters.

Major choices agreed with motives. For example, to get a job or to explore a career were most often reasons for enrollment among professional technical students; adult enrichment was the major most often chosen by those enrolling for enrichment purposes; and a four-year degree was most often chosen by those whose goal was to earn a bachelor's degree. The duration of enrollment expected was predictably least for enrichment and high school students, and most for lower-division and professional technical students, particularly among transcripters.

Frequencies were run of the 60 professional technical majors who were transcripters, to find out wat specific majors they chose. Sixty-seven percent were in the Business and management Certificate of Advanced Mastery (CAM) endorsement area. Fifteen percent were in Human Resources (all Early Childhood Education); 10% were in Health Services and 8% in Industry and Engineering. Among those in Business and Management, 43% were in Hospitality and Tourism and another 20% were in a Legal Secretary major.

The 56% of enrichment students in the sample is higher than expected, given that so few two-plus-two students selected enrichment as a major, and the original sample matched major and first term of attendance. The ratio of enrichment students in the sample to those in the two-plus-two groups must have been very high. Enrichment students were 46% of MHCC's 1991-92 total headcount enrollment. Majors are shown in Figure 3, opposite, and in Table 8, page 19.

Persistence. A majority of all students attended MHCC no more than one year, at 78% for the sample, 61% for transcripters and 52% for non-transcripters. Any study of persistence across years was limited by small two-plus-two enrollment the first two years and the diminishing number of years thereafter, so the only comparative measure for all years was the coincidence of first and last years of attendance. However, by the third year of the study, 1989-90, 20% of transcripters and 15% of non-transcripters enrolled for two years, compared to 11% of the sample. Of these 1989-90 students, 21% of transcripters and 15% of non-transcripters attended four years, compared to 13% of the sample.

The first-year enrollment of transcripters was fewer than 10 the first two years of the study, but was up to 109 in 1989-90, down to 91 in 1990-91, up to 137 in 1991-92 but down to 71 in 1992-93. 1989-90 and 1991-92 were also the highest enrollment years for non-transcripters. Enrollment for the sample varied from 147 to 210, except for a drop in 1992-93 to 84. See Table 9, page 19.

High School of Origin. Most two-plus-two students came from the eight high schools in the Consortium, while the opposite was true for the sample. Transcripters had just 3% of students coming from schools outside the Consortium, while non-transcipters had 22% and the sample 80%. Among high schools, David Douglas had the most transcripters by far, at 31%, followed by Sandy and Parkrose, each at 15%, and by Reynolds, at 12%. The highest percentage of non-transcripters was from Gresham, at 21%, followed by David Douglas, at 13%, Reynolds and Sam Barlow, each at 12%, and Parkrose at 11%. Data for all Consortium tech prep students in 1992-93 show that David Douglas also had the highest number of students. Enrollment was next highest at Gresham, then Reynolds, with Sandy lowest in enrollment (Corbett was not included in the data). The high shares of transcripters from Sandy, as well as at Parkrose, ranking fifth in total enrollment, indicates strong support for articulated programs at these schools as well as at David Douglas. See Figure 4, opposite, and Table 10, page 20.

Performance

Measures of performance used were College Placement Test scores, cumulative hours earned and grade point average (GPA)). These measures varied considerably when controlling for no high school major code. Excluding such students leaves a group of matriculating students who have clearly attended MHCC following the initial request for transcript credit in high school. Similarly, controlling for fewer than 12 earned credits, as in the Owens study, defines a group of students with more serious intent, with much different performance results. Performance measures exclude enrollment in non-credit classes, typical of the high proportion of enrichment students in the sample, since no hours are attempted nor grade points earned. Students only enrolled in non-credit classes would not be required to take placement tests.

Figure 3: Choice of Major Type by Students

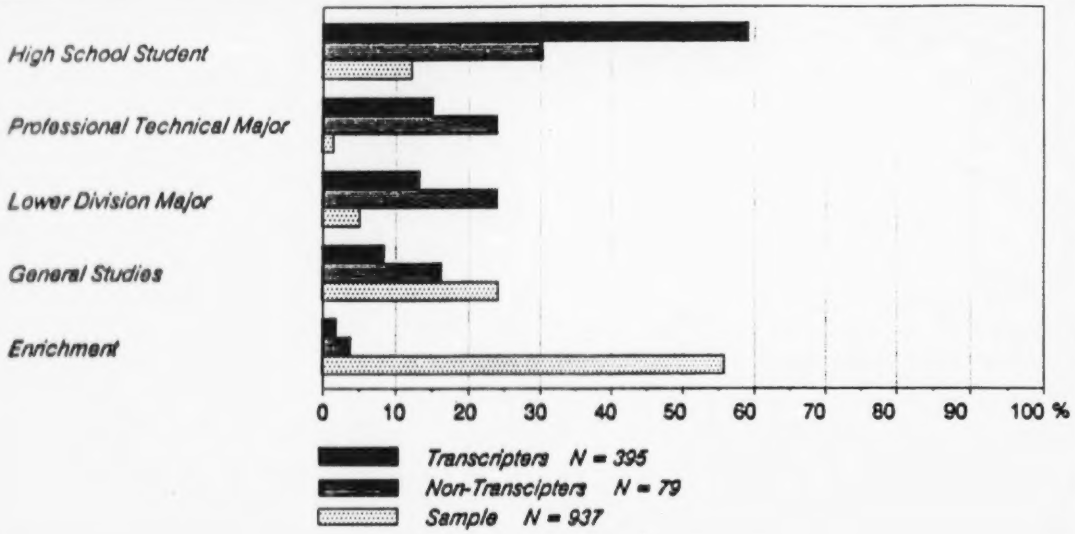
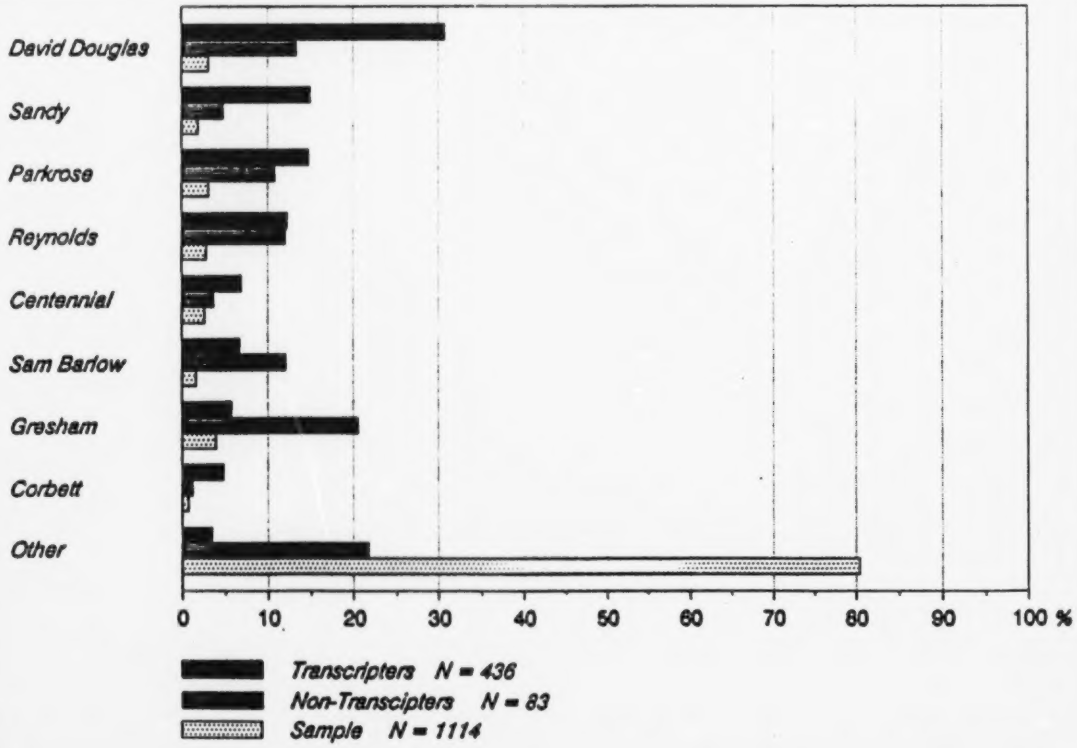


Figure 4: High School Origin of Students



BEST COPY AVAILABLE

College Placement. Placement test scores for reading, writing and mathematics are used to determine students' needs for Guided Studies. Tests are required of students first entering college (or if previous transcripts lacked appropriate course completion) and enrolling for nine or more credits or in a reading, writing or math course.

Placement tests were taken by 180 or 41% of transcripters, 35 or 42% of non-transcripters, and 100 or 9% of the sample. The very high percentage of the sample not taking tests indicates prior college attendance as well as low course loads, non-degree goals and high enrichment enrollment, but the nearly 50% of two-plus-two students not taking tests suggests that continuing enrollment and program completion at MHCC were not sought by these students, as well.

In the placement test for reading, 11% of transcripters, 29% of non-transcripters and 10% of the sample needed to take Guided Studies classes, while in writing the percentages were 18% of the transcripters, 23% of non-transcripters and 19% of the sample. Math scores indicated Guided Studies placement for 18% of transcripters, 23% of non-transcripters and 22% of the sample. These data show nearly as high or higher performance among transcripters and lower performance among non-transcripters than the sample. See Figure 5, opposite.

Excluding no high school majors reduced the number taking placement tests to 124 transcripters, 25 non-transcripters and 75 sample students. These results show that transcripters did slightly less well while non-transcripters and sample students did better. Transcripters continued to outperform non-transcripters, but only in math did they have a lower percentage needing Guided Studies than sample students.

Limiting results to those earning 12 or more units, the lower-division PTE1 transcripters consistently outperformed the PTE2 professional technical students, but fell below the sample except for math. For the overall results and the subsamples, see Tables 11 through 13, pages 20-21.

Hours Earned. Cumulative hours earned from 1978-88 to 1992-93 were more than 12 for 40% of transcripters, 57% for non-transcripters and 31% for the sample. No hours attempted were recorded for 17% of transcripters, 24% of non-transcripters and 66% of the sample. No hours attempted could mean enrollmelnt in non-credit courses or withdrawal. It should be recalled that the increasing number of recent transcripters had less time to accumulate credit toward the end of the six-year study. Nevertheless, while 40% of transcripters earned more than 12 credits, 27% earned more than 30 credits and 11% more than 60. Credit accumulation was even higher for the 57% of non-transcripters earning more than 12 units; 46% earned more than 30 and 22% more than 60 units. This is in sharp contrast to the sample's 31% with more than 12 units, 18% with more than 30 and 6% with more than 60 units. See Figure 6, opposite, and Table 15 on page 21.

Figure 5: College Placement in Guided Studies

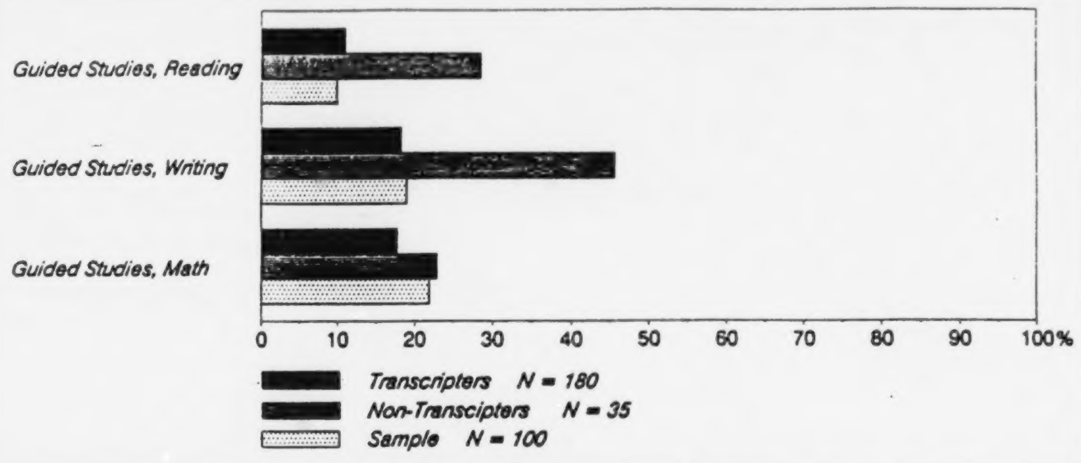


Figure 6: Cumulative Hours Earned

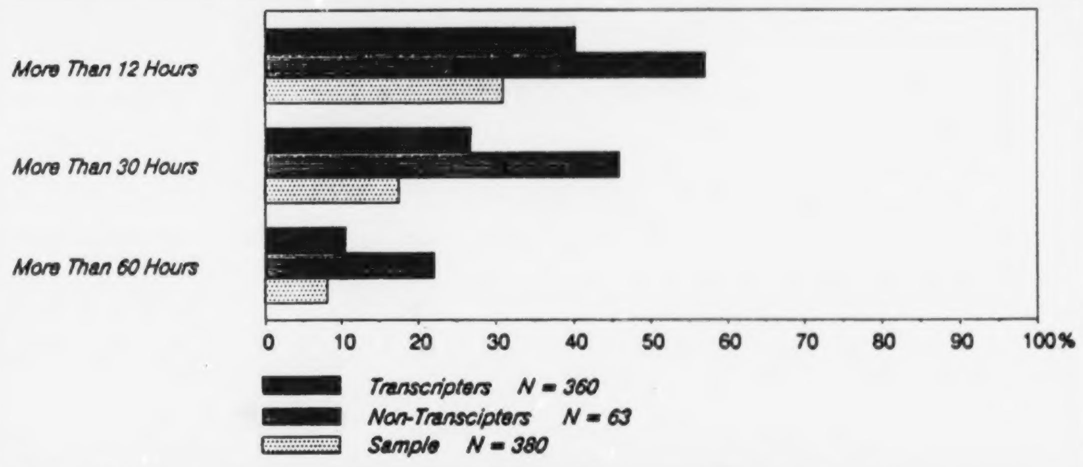
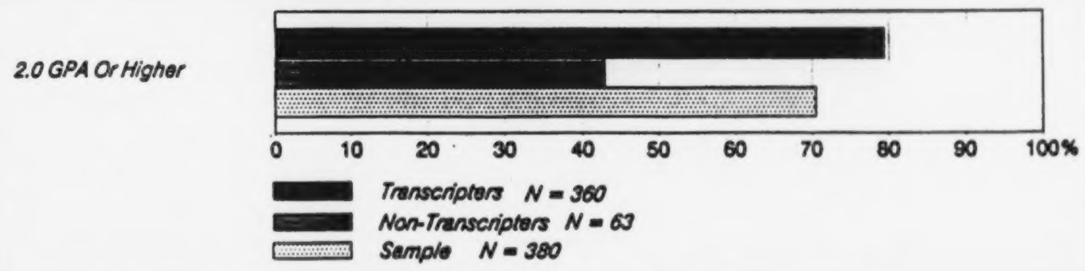


Figure 7: Grade Point Average (GPA) Earned



BEST COPY AVAILABLE

Hours earned were also analyzed by the 91 students selecting a professional technical major. These results show that 88% of the 60 transcripters earned more than 12 hours of credit, compared to 79% of both the 19 non-transcripters and the 15 sample students. Higher percentages of hours earned by transcripting students also held for lower-division and general education majors, but for high school students, primarily transcripters, 72% earned six or fewer hours. Most enrichment majors, nearly all from the sample, earned no more than six hours. These data clearly show the effects of intentionality on performance.

The number of hours earned was studied by year as well. The mean number of hours per student earned by transcripters rose steadily from 8 in 1989-90 to 18 in 1992-93, while the mean ranged from 21 to 23 hours for non-transcripters and from 11 to 14 for the sample.

Hours earned for students with no high school major code were much higher for transcripters and non-transcripters. Those earning more than 12 hours went up from 40% to 77% for transcripters and from 57% to 69% for non-transcripters. More than 12 hours earned for the sample was nearly the same, going up from 31% to 32%.

GPA. A cumulative grade point average, or GPA, was calculated by dividing total grade points by hours attempted for all years. Seventy-nine percent of transcripters earned a 2.0 or better, compared to 71% of the sample and 43% of non-transcripters. A GPA of 2.0 or higher was earned by 81% of all MHCC professional technical students in 1992-93, and by 60% of all credit students.

Excluding those with a high school major code, performance declined for all groups but more sharply for transcripters than others, placing them lower in GPA than the sample. A 2.0 or higher GPA was earned by 57% of transcripters, 37% of non-transcripters and 67% of the sample.

In the Owens study limiting results to those with a minumum of 12 hours earned, the mean GPA was 1.80 for PTE2 professional technical students, 1.95 for PTE1 lower-division students and 2.0 for sample students. See Figure 7 on the previous page and Table 14, page 21.

Variation in GPA was also analyzed by majors for which there was sufficient enrollment. GPAs were higher for high school and lower for general studies, lower-division and professional technical majors than for all cases. The pattern of transcripters highest and non-transcripters lowest in percentages with a 2.0 or better held for general studies and high school majors, but not for lower-division and professional technical majors, where sample students more often had a 2.0 average or better. This suggests that the overall comparable or higher performance of transcripters than the sample was somewhat dependent on the higher grade in the high school transcripted course or courses, while those matriculating into other majors did less well—a finding consistent with results when excluding high school majors or those with fewer than 12 earned credits.

As with hours earned, year-to-year GPA data were reviewed. The pattern of higher GPAs for transcripters than sample students, and lower GPAs for non-transcripters held for all years. While there was little variation in GPA for the sample or non-transcripters, there was a decline of .4 points in GPA among transcripters between 1990-91 and 1992-93.

Conclusions

The data show uneven results of two-plus-two programs. Certainly the numbers of transcripters has risen, with increased hours earned per student. Two-plus-two students more often than sample students chose job preparation motives, degree goals and professional technical majors. Transcripters performed comparably or better than sample students on placement tests and they earned more hours and higher GPAs. Non-transcripters, while scoring lower in placement tests and earning lower GPAs than others, earned more credit hours. These data are positive results of Consortium efforts.

But the data do not show many two-plus-two students going on from a tech prep program in high school to full-time enrollment in an articulated professional technical program at MHCC. The two-plus-two link, while encouraging some students, is not a very strong one for most students. Few high school students requesting transcripts were prepared to decide on a career path, or to follow up with additional enrollment at the College. A third of transcripters earned just 1 to 3 credits, typically the completion of one class, while another 27% earned from 4 to 12 credits. Major choices were most often "high school" rather than a professional tecnical major, indicating no further enrollment at the College. Among transcripters who did not later attend MHCC, 68% earned no more than three credits – twice as many as for all transcripters.

Excluding high school "majors," an assigned code for students requesting transcripts for articulated high school courses, creates a subcategory of matriculating students who did go on to enroll from high school to MHCC. Performance data for these students is not as good. Matriculating transcripters did less well than all transcripters or the sample on placement tests, except for math, and in GPA. Matriculating non-transcripters did better on placement tests but not as well in GPA as all non-transcripters; they contined to outperform all others in hours earned.

Looking at professional technical enrollment only, which was just 94 of the 1,633 cases, hours earned was much higher for all three groups, with more than 12 units earned by 90% of transcripters, 80% of non-transcripters and 85% of the sample, compared to 33%, 43% and 11% for the three groups in all majors. However, those earning a 2.0 GPA or better were lower for all groups and lower for transcripters than for the sample, at 45% compared to 54%, with non-transcripters at 32%. Since goals among the three groups are more consistent with two-plus-two purposes, this appears to be an important finding, marred somewhat by the small number (15) of sample students.

In the Owens study limiting students to those earning 12 units or more, comparing lower division and professional technical transcripters to the sample, lower division PTE1 students did better than professional technical PTE2 students in all placement tests and in GPA, but the sample outperformed both transcripter groups except for a lower percentage of PTE1 students needing Guided Studies in math.

The lower placement and GPA of the no high school code and Owens' subsamples suggest that two-plus-two programs most benefit those students less able to compete academically but with strong job-related motives. This was particularly true for non-transcripters. For many high school students, two-plus-two programs have offered a means of developing skills and advancing employment opportunity.

The original design of the study could not have anticipated some of the data problems that were encountered. Small numbers of non-transcripters and of professional technical students reduce confidence in some of the comparisons. Large numbers of enrichment students in the sample exaggerate difference in age, motives and hours earned. Although performance measures such as testing, hours earned and GPA excluded such students, the number of sample students was substantially reduced.

This study has been provocative and further study is anticipated as a means of evaluating regional tech prep, two-plus-two and college professional technical programs. Several improvements in the study design are being considered, such as how the sample might be made more comparable and the use of transcript analysis. A study of articulation processes needs to supplement statistical analyses.

It is likely that with the developemnt of the Certificate of Advanced Mastery curricula in Oregon high schools over the next two years, two-plus-two articulated programs will remain important options within endorsement areas. More attention to career choice, both in advising and in curricula, may accelerate high school students' decision about majors. The continuing study of transcripting students can provide data over time to document these changes.

Tables

Table 1: Age, Overall in 1993 and the Owens Study Page 17

Table 2: Sex, Overall and the Owens Study 17

Table 3: Educational Level 17

Table 4: Employment 17

Table 5: Enrollment Motive, Overall and the Owens Study 18

Table 6: Educational Goal, Overall and the Owens Study 18

Table 7: Expected Duration of Enrollment 19

Table 8: Enrollment by Major Type 19

Table 9: Enrollment for One Year or Less 19

Table 10: High School of Origin 20

Table 11: Placement in Reading, Overall, No High School and the Owens Study 20

Table 12: Placement in Writing, Overall, No High School and the Owens Study 20

Table 13: Placement in Math, Overall, No High School and the Owens Study 21

Table 14: Grade Point Average, Overall, No High School and the Owens Study 21

Table 15: Cumulative Hours Earned, Overall and No High School 21

Table 1: Age, Overall in 1993 and the Owens Study

Students/Years	% <20	% 21-25	% >25	Total N	Students/Years	% <21	% 22-25	% >25	Total N
Overall:					Owens Study:				
Sample	10.2	19.1	70.6	1114	Sample	48.6	32.8	7.6	183
Non-transcripters	25.3	73.5	1.2	83	PTE1	63.7	9.3		43
Transcripters	81.1	17.8	1.1	428	PTE2	77.4	20.6	1.8	53
Total	29.7	21.5	48.8	1625	Total	59.4	28.0	12.6	279

Table 2: Sex, Overall and the Owens Study

Students/Sex	% Female	% Male	Total N	Students/Sex	% Female	% Male	Total N
Overall:				Owens Study:			
Sample	51.3	48.7	1114	Sample	65.2	34.8	184
Non-transcripters	42.2	57.8	83	PTE1	69.8	30.2	43
Transcripters	79.4	20.6	436	PTE2	84.9	15.1	53
Total	29.7	48.8	1633	Total	69.6	30.4	280

Table 3: Educational Level

Students/Levels	% Less than HS Grad	% GED	% HS Grad	% 2 Years College, No Deg	% 3 Years College, No Deg	% Certif	% AA Deg	% BA Deg Or More	Total N
Sample	16.5	4.9	40.9	12.9	3.9	1.8	4.1	15.0	930
Non-transcripters	29.3	1.2	61.0	6.1	2.4				82
Transcripters	52.7	0.7	36.2	8.3	0.9	0.2	0.7	0.2	423
Total	27.9	3.5	40.6	11.1	2.9	1.3	2.9	9.8	1435

Table 4: Employment

Students/Employment	% Full-time	% Part-time	% None	Total N
Sample	50.3	23.4	26.3	835
Non-transcripters	20.0	64.3	15.7	70
Transcripters	13.0	66.9	20.1	299
Total	39.3	36.5	24.2	1204

Table 5: Enrollment Motive, Overall and the Owens Study

Students/Motives	% Get a Job	% Improve in Job	% Better Job	% Enrich-ment	% Explore a Career	% Other	Total N
Overall:							
Sample	10.8	22.1	7.8	28.0	16.0	15.3	924
Non-transcripters	22.4	3.0	7.9	6.6	46.1	13.2	76
Transcripters	19.5	1.2	9.9	4.7	40.1	24.7	344
Total	13.7	15.7	8.3	20.8	23.9	17.6	1344
Owens Study							
Sample	16.4	2.9	14.0	9.4	40.9	16.4	171
PTE1	16.7	2.4	11.9	4.8	61.9	2.4	42
PTE2	43.4		17.0	3.8	30.2	5.6	53
Total	21.8	2.3	14.3	7.5	42.1	12.0	266

Table 6: Educational Goal, Overall and the Owens Study

Students/Goals	% One Class	% A Few Classes	% 2 Year Degree	% Certif	% GED	% 4 Year Degree	% Other	Total N
Overall:								
Sample	42.8	17.6	10.2	1.6	1.3	15.1	11.4	853
Non-transcripters	9.2	6.6	28.9	3.9	1.3	39.5	10.5	76
Transcripters	5.4	5.1	26.9	1.1	0.3	40.5	20.7	353
Total	30.5	13.5	11.1	1.6	1.0	23.6	13.9	1282
Owens Study								
Sample	6.3	4.0	22.7	2.3		58.0	6.8	176
PTE1			30.2			69.8		43
PTE2	1.9		79.2	3.8		15.1		53
Total	4.4	2.6	34.9	2.2		51.5	4.4	272

Table 7: Expected Duration of Enrollment

Students/Durations	% 1 Qtr	% 2 Qtrs	% 1 Year	% 2 Years	% 3 Years	% > 3 Years	Total N
Sample	63.8	7.6	10.9	11.2	2.8	3.7	845
Non-transcripters	38.5	9.0	12.8	35.9	2.6	1.3	78
Transcripters	39.7	8.4	18.0	31.0	2.0	0.9	345
Total	55.7	7.9	12.9	18.1	2.6	2.8	1268

Table 8: Enrollment by Major Types

Students/Majors	% Lower Division	% General Studies	% Enrichment	% ABE/ GED	% Prof Technical	% High School	% Undecided	Total N
Sample	5.2	24.2	55.8	0.9	1.6	12.3		937
Non-transcripters	24.0	16.4	3.9	1.3	24.0	30.4		79
Transcripters	13.4	8.6	2.0		15.2	59.2	1.5	396
Total	8.6	19.4	37.8	.6	6.7	26.5	0.4	1411

Table 9: Enrollment for One Year or less

Students/Years	% 1987-88	% 1988-89	% 1989-90	% 1990-91	% 1991-92	% 1992-93	1 Year Subtotal	% of Total	Total N
Sample	66.8	81.2	67.5	82.2	82.9	54.3	665	77.8	855
Non-transcripters	16.7	53.8	40.0	50.0	12.8	1.9	35	52.2	67
Transcripters			49.4	39.6	75.3	43.8	170	61.4	277
One-year subtotal	134	119	129	169	214	105	870	72.6	1199
Percent subtotal	63.5	75.8	58.1	71.3	80.1	100.0*			
One-year subtotal	134	119	129	169	214	105			

**Crosstabulations were for first year of attendance controlling for last year of attendance, so that only those for whom 1992-93 was the last year were identified for this last year of the study. 434 students, or 25% of all cases, were still enrolled at the end of 1992-93.*

Table 10: High School of Origin

Students/Schools	% Centennial	% Corbett	% David Douglas	% Gresham	% Parkrose	% Reynolds	% Sandy	% Sam Barlow	% Other	Total N
Sample	2.6	0.7	3.1	3.9	3.1	2.8	1.9	1.6	80.4	1114
Non-transcripters	3.6	1.2	13.3	20.5	10.8	12.0	4.8	12.0	21.7	83
Transcripters	6.9	4.8	30.7	5.7	14.7	12.2	14.9	6.7	3.4	436
Total	3.8	1.8	11.0	5.2	6.6	5.8	5.5	3.5	56.9	1633

Table 11: Placement in Reading, Overall, No High School and the Owens Study

Students/Majors	% Guided Studies	% College Level	Total N		% Guided Studies	% College Level	Total N
Overall				No high school major code			
Sample	10.0	90.0	100	Sample	8.0	92.0	75
Non-transcripters	28.6	71.4	35	Non-transcripters	20.0	80.0	25
Transcripters	11.1	88.9	180	Transcripters	12.1	87.9	124
Total	12.7	87.3	315		11.6	88.4	224
Owens Study							
Sample	6.6	93.4	76				
PTE1	8.6	91.4	35				
PTE2	20.4	79.6	44				
Total	11.0	89.0	155				

Table 12: Placement in Writing, Overall, No High School and the Owens Study

Students/Majors	% Guided Studies	% College Level	Total N		% Guided Studies	% College Level	Total N
Overall				No high school major code			
Sample	19.0	81.0	100	Sample	16.0	84.0	75
Non-transcripters	22.9	77.1	35	Non-transcripters	44.0	56.0	25
Transcripters	18.3	81.7	180	Transcripters	20.2	79.8	124
Total	21.6	78.4	315		21.4	78.6	224
Owens Study							
Sample	17.1	82.9	76				
PTE1	20.0	80.0	35				
PTE2	27.3	72.7	44				
Total	20.6	79.5	155				

Table 13: Placement in Mathematics, Overall, No High School and the Owens Study

Students/Majors	% Guided Studies	% College Level	Total N		% Guided Studies	% College Level	Total N
Overall				No high school major code			
Sample	22.0	78.0	100	Sample	18.7	81.3	75
Non-transcripters	22.9	77.1	35	Non-transcripters	12.0	88.0	25
Transcripters	17.8	82.2	180	Transcripters	18.5	81.5	124
Total	19.7	80.3	315		17.9	82.1	224
Owens Study							
Sample	13.2	86.8	76				
PTE1	8.6	91.4	35				
PTE2	29.6	71.4	44				
Total	16.8	83.2	155				

Table 14: Grade Point Average, Overall, No High School and the Owens Study

Students/GPAs	% 2.00 or Above	Total N		% 2.00 or Above	Total N		GPA	Total N
Overall			No high school major code			Owens Study		
Sample	70.5	380	Sample	67.2	332	Sample	2.20	184
Non-transcripters	42.9	63	Non-transcripters	36.7	49	PTE1	1.96	43
Transcripters	79.4	360	Transcripters	57.2	159	PTE2	1.80	53
Total	72.4	803		61.5	540	Total	2.09	280

Table 15: Cumulative Hours Earned, Overall and No High School

Students/Hours	% None	% 1-3	% 4-6	% 7-12	% 13-30	% 31-60	% More than 60	Total N	% More than 12	% More than 30
Overall										
Sample	5.0	31.1	17.4	15.5	13.4	9.5	8.2	380	31.1	17.6
Non-transcripters	3.2	14.3	11.1	14.3	11.1	23.8	22.2	63	57.1	46.0
Transcripters	0.6	32.5	13.6	13.1	13.3	16.4	10.6	360	40.3	26.9
Total	2.9	30.4	15.2	14.3	13.2	13.7	10.3	803	37.2	24.0
No high school major code										
Sample	5.7	31.9	16.3	14.2	12.0	10.5	9.3	332	31.9	19.9
Non-transcripters	2.0	10.2	6.1	12.2	14.3	26.5	28.6	49	69.4	55.1
Transcripters	0.6	4.4	8.8	9.4	19.5	33.3	23.9	159	76.7	57.2
Total	3.9	21.9	13.1	12.6	14.4	18.7	15.4	540	48.5	34.1

References

1. Conrath, Nancy L. Higher Education Institutional Research Services (HEIRS), in cooperation with the Office of Research, Planning and Computer Services, Mt. Hood Community College, and the Mt. Hood Regional Cooperative Consortium. *Evaluation of Professional Technical Programs in the Mt. Hood Regional Cooperative Consortium, Final Report*, Mt. Hood Community College, Gresham, Oregon, August 25, 1994.
2. Mt. Hood Regional Cooperative Consortium. *Benchmarks & Milestones, 1993 Annual Report*, Mt. Hood Community College, Gresham, Oregon, n.d.
3. Owens, Thomas R., Senior Associate, Education and Work Program, Northwest Regional Educational Laboratory. *Mt. Hood Tech Prep Articulation Study*, Northwest Regional Educational Laboratory, Portland, Oregon June 8, 1994.
4. Walleri, R. Dan, Director, Office of Research, Planning and Computer Services, Mt. Hood Community College. *Assessment of 2+2 in the Mt. Hood Regional Consortium: Summary of Preliminary Findings and Proposal for Additional Research*, Mt. Hood Community College, Gresham, Oregon, June 29, 1994.

THE Northwest Regional Educational Laboratory

APPENDIX D

EVALUATION OF PROFESSIONAL TECHNICAL PROGRAMS IN THE MT. HOOD REGIONAL COOPERATIVE CONSORTIUM

December 30, 1994

Northwest Regional Educational Laboratory
101 S.W. Main Street, Suite 500
Portland, Oregon 97204

EVALUATION OF PROFESSIONAL TECHNICAL PROGRAMS IN THE MT. HOOD REGIONAL COOPERATIVE CONSORTIUM

Prepared by

Dr. Thomas R. Owens
Education and Work Program
Northwest Regional Educational Laboratory
101 S.W. Main Street, Suite 500
Portland, Oregon 97204

December 30, 1994

CONTENTS

LIST OF FIGURES v

LIST OF TABLES v

MT. HOOD TECH PREP DEMONSTRATION PROJECT EVALUATION REPORT 1

Introduction 1

1. EVALUATION ACTIVITIES 1

2. PROGRAM DESCRIPTION 2

The Consortium 2

Funding 2

Description of the Tech Prep Program and Population 3

Curriculum Development 6

Articulation 7

Counseling, Guidance, and Career Development 8

Staff Development 9

Student Outcomes 9

Monitoring/Evaluation 9

Areas of Success and Obstacles 10

3. CONSORTIUM STUDENT SURVEY 10

4. ARTICULATION STUDY 13

Introduction 13

Findings 14

5. EVALUATION RECOMMENDATIONS 19

APPENDIX A MT. HOOD CONSORTIUM STUDENT SURVEY 21

LIST OF FIGURES

1 Number of Students Transcripting Credit Through Tech Prep 5
2 Number of Credits Transcripted Through Tech Prep 5

LIST OF TABLES

1 Number of High School Students Transferring Tech Prep Credits into Mt. Hood 4
2 Number of Districts Offering Various Workplace Experiences 6
3 Number of High Schools and Community Colleges Engaged in New or Substantially Revised Academic Courses 6
4 Number of High Schools and Community Colleges Using Commercially Available Applied Academics Curricula 7
5 Career Development Activities at the Middle, High School, and Postsecondary Level Provided by Some (S) or All (A) Schools or Areas within Mt Hood Community College 8
6 Number and Percentage of Students Responses by High School 11
7 Professional Technical Education Courses Taken in High School and Desired in a Community College 11
8 Number of High School Students Interested in Taking a Professional/Technical Education Program at Mt. Hood Community College 13
9 Number of Students by Credits Earned at Mt. Hood Community College 14
10 Age of Students by Group 15
11 Mean GPA by PTE Status 15
12 Gender Percentages by PTE Status 15
13 Ethnic Percentages by PTE Status 16
14 Goal Percentages by PTE Status 16
15 Motive Percentages by PTE Status 17
16 Percentage of Students Needing Guided Studies in Reading by PTE Status 17
17 Percentage of Students Needing Guided Studies in Math by PTE Status 17
18 Percentage of Students Needing Guided Studies in Writing by PTE Status 18
19 Percent of Students Needing Guided Studies in More Than One Area 18
20 Percentage of PTE1 and PTE2 Students Needing Guided Studies by Year of High School Graduation 18
21 Percentage of Comparison Group Students Needing Guided Studies by Year of High School Graduation 19

MT. HOOD TECH PREP DEMONSTRATION PROJECT EVALUATION REPORT

Introduction

This report summarizes data that have been collected during the two years of the evaluation of the Mt. Hood Tech Prep Demonstration Project by the Northwest Regional Educational Laboratory which is serving as the external evaluation contractor. Section 1 provides a summary of the evaluation activities; Section 2, a comprehensive description of the project based on input from sections of the Mathematica Policy Research, Inc. local Tech Prep inventory; Section 3, the findings from a survey of 2,391 11th and 12th grade students in the Consortium, Section 4, results of the analysis of a follow-up study, and Section 5, evaluation recommendations. We recognize the contribution made to the evaluation by others. Jack Miller, Dean of Community and Vocational Development at Mt. Hood Community College, serves as project director of this demonstration project and has completed the Mathematica Policy Research Local Tech Prep Inventory which was summarized in this report. Michael Dillon took over as project director in 1994 upon the retirement of Jack Miller. Marcia Dier, the project coordinator, provided useful information regarding the dissemination of the project. Vern Halcromb, the Multnomah ESL Regional Professional Technical Education Coordinator, facilitated the distribution and return of the student surveys. Dan Walleri, Director of Planning and Research, and Marilyn Kennedy of the Admissions Office at the Mt. Hood Community College helped in identifying the types of information available on their community college students.

1. EVALUATION ACTIVITIES

During this demonstration project a number of evaluation activities were conducted by NWREL. These activities included:

- Formatting an evaluation advisory committee composed of secondary and postsecondary personnel who reviewed draft documents and advised on the implementation of the evaluation

- Preparing and revising an evaluation design specifying the purposes for the evaluation, framework, key evaluation questions, data collection processes, timelines, and reporting procedures

- Attending the USOE meeting in Washington D.C. for project directors and project evaluators to discuss the requirements and approaches for evaluation and the procedures for the Program Effectiveness Review Panel

- Working with the project director in completion of a comprehensive local Tech Prep inventory documenting the structure and activities of the project

- Designing data collection survey forms for collection of feedback information from site visitors about the dissemination process

- Working with the project staff and evaluation advisory committee to define what the project means by Tech Prep students

- Designing and using of a high school student survey in May to document the educational and occupational intents of all 11th and 12th grade students in the Consortium as well as their view of Tech Prep and interest in participating.

- Working with the director of institutional research on a study of community college Tech Prep students

- Meeting with the Mt. Hood Regional Cooperative Consortium monthly to update them on the Tech Prep evaluation findings

- Meeting with the Mt. Hood Regional Cooperative Consortium in May, 1994 for their day of planning for the coming year.

2. PROGRAM DESCRIPTION

The Consortium

The Mt. Hood Community College Tech Prep Program Consortium is composed of representatives of Mt. Hood Community College District, the Multnomah Educational Service District, and seven school districts — Centennial, Corbett, David Douglas, Gresham/Barlow, Parkrose, Reynolds, and Sandy Union High. Also represented are a postsecondary propriety school, three postsecondary apprenticeship programs, three businesses, a business/industry association, a labor group, and a representative from the Oregon Department of Education. Mt. Hood Community College District has a total annual enrollment of approximately 27,000 students. The Consortium meets monthly on the second Thursday of each month during the academic year.

The Consortium does not have a governing board or working committees, but it does have active working members. The consortium has a 2.0 person professional staff and a 1.0 clerical staff.

Funding

The Consortium received its Carl Perkins funding through the Oregon Department of Education starting in 1986 and its US Department of Education national demonstration grant of $308,000 in 1993. Last fiscal year the Consortium received a $103,000 title III-E grant and a $70,000 title II-C grant through the state. In addition, it received a $25,000 planning grant from The Boeing Company.

Business and industry have been active partners in this Consortium by working with students and staff and providing material resources. In working with students, they have provided career awareness opportunities for students in the early phases of Tech Prep, opportunities for students to tour facilities, work-based learning opportunities, and priority in hiring Tech Prep graduates. With staff they have assisted in defining program outcomes, identifying/refining occupational areas, promoting or marketing Tech Prep, supporting staff development activities for counselors and instructors through workplace visits and discussions, and providing speakers for career education days. In addition, they have provided awards or scholarships for teachers, equipment or materials, and space for classes or other activities.

Overall, the Consortium last year spent approximately 60 percent of their budget on general administration, 30 percent on staff development, 5 percent on marketing/promotion, and 5 percent on supplies.

Description of the Tech Prep Program and Population

Under the Mt. Hood Tech Prep model, students are involved in grades 9 to 14 plus opportunities to continue into an apprenticeship or a four-year college program. No single definition of a required core program for all secondary-level Tech Prep students has been implemented by all Consortium members. Five of the seven local school districts have defined a core program for all Tech Prep students.

Although the state has not provided a definition of secondary Tech Prep students, the Consortium members have agreed upon a definition. Students must explicitly elect Tech Prep as a path or take one or more vocational courses. The Consortium's definitions of secondary and postsecondary Tech Prep students were reported in Section 1 of this report.

The school districts in the Consortium began to track transcripted credits into the community college in 1988. Although not all of these students would be considered Tech Prep students, the Consortium director estimates that there were approximately 1,500 Tech Prep students in each of grades 9 to 12 last year. This represents about half of the secondary students.

Of the four-year secondary students, approximately 2 percent are Black, 3 percent are Hispanic, 1 percent are Native American, 2 percent are Asian or Pacific Islanders, and 92 percent are White. Approximately 55 percent are female, 5 percent limited English proficient, 10 percent with handicaps or disabilities, and 15 percent economically and/or educationally disadvantaged.

Efforts have been made to attract all special populations into Tech Prep. There has also been emphasis on attracting students into occupations that are non-traditional for their gender. Males have been recruited into early childhood education, hospitality/tourism, and nursing. Females are invited to enroll in welding, manufacturing, automotive, and forestry technology.

A variety of services or accommodations are being used to access Tech Prep for special populations. These include inclusion of special populations coordinators in the Tech Prep team, materials in the student's native language, use of interpreters, physical access accommodations, special equipment, transportation, child care, and coordination with JTPA programs.

Students in the Consortium explicitly choose between Tech Prep and other programs. In six of the districts, students also choose an occupational cluster. These occupational clusters, articulated between the high schools and Mt. Hood Community College, are accounting, automotive, cable and community television, early childhood education, electronics, engineering technology, entrepreneurship/small business management, horticulture, hospitality/tourism, journalism, manufacturing technology, office technology, and welding technology. These programs have been developed in cooperation with area business and industry representatives to ensure that technical training includes the skills and knowledge required by area employers.

In 1991-92, a total of 252 Tech Prep high school students transcripted professional technical education course credits into Mt. Hood Community College. By 1993-94, the number jumped to 478. Table 1 shows the number of students by occupational area, with the largest being in office occupations and early childhood education. In 1994 a total of 931 credits were transcripted by Mt. Hood Community College.

Table 1
Number of High School Students
Transferring Tech Prep Credits into Mt. Hood

	Number of Students		
Program Area	**1991-92**	**1992-93**	**1993-94**
Office Occupations	77	149	238
Early Childhood Education	70	21	19
Hospitality/Tourism	48	34	28
Computer Science	29	48	38
Work Experience	9	56	64
Manufacturing Technology	7	8	14
Welding	7	9	23
Automotive	5	0	0
Engineering	-	-	16
Graphics	-	-	8
Marketing	-	-	13

The number of high school students transcripting professional technical education course credits into Mt. Hood Community College has increased steadily since 1988-89. Figure 1 shows the increase in students while Figure 2 reflects the increase in terms of the number of credits transcripted.

Figure 1
Number of Students
Transcripting Credit Through Tech Prep

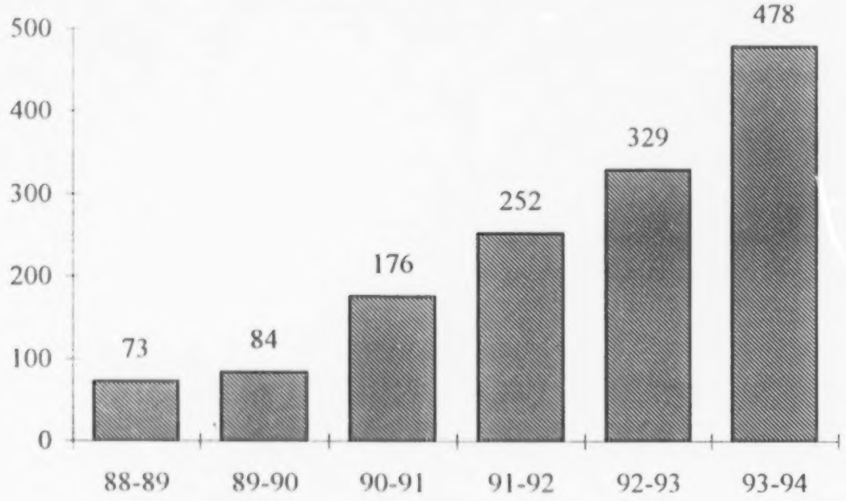
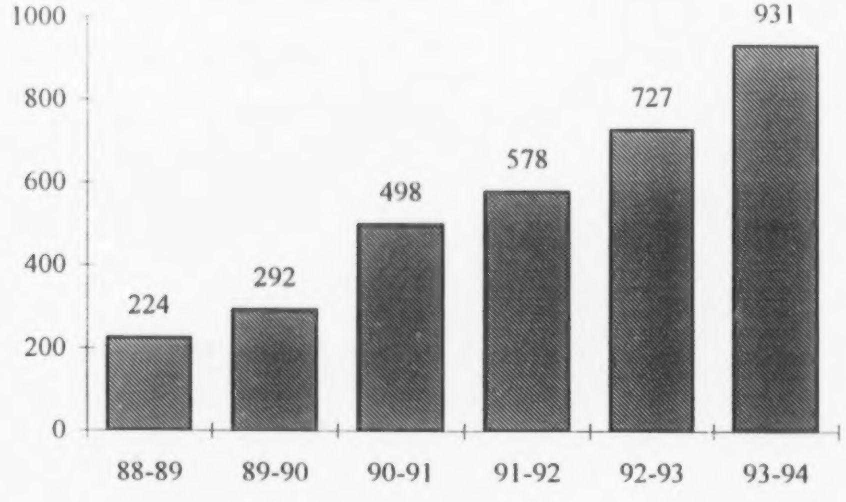


Figure 2
Number of Credits Transcripted Through Tech Prep



The school districts all offer some form of workplace experiences. Table 2 indicates the number of school districts offering each type of workplace experience. The most commonly offered is placement in part-time employment related to a student's occupational program. None of the districts currently offer youth apprenticeship at employer work sites.

Table 2
Number of Districts Offering Various Workplace Experiences

Experience	Frequency
Placement in part-time employment related to student's occupational program	7
Placement in paid part-time employment during the school year as part of a co-op placement	6
Visits to employer work sites as part of student's occupational program	4
Internships	3
Participation in employer-sponsored training/classes	2
Placement in a summer job related to student's occupational program	2

Curriculum Development

Additions or revisions in academic courses have occurred at both the secondary and postsecondary level. Table 3 shows the number of high schools and community colleges engaged in such curriculum revision. As noted, the greatest change was the addition of applied economics.

Table 3
Number of High Schools and Community Colleges
Engaged in New or Substantially Revised Academic Courses

Area	HS	CC
Economics	7	1
English	4	1
Mathematics	3	1
Physics	3	0
Biology	2	0
Chemistry	2	0

Commercially available applied academic curricula are being used in all of the participating high schools and at Mt. Hood Community College. Table 4 shows the number of schools using each applied curriculum. Applied Economics is being used in each high school.

Table 4
Number of High Schools and Community Colleges Using Commercially Available Applied Academics Curricula

Area	HS	CC
Applied Economics	7	1
Applied Communications	4	1
Applied Mathematics	3	1
Principles of Technology	3	0
Applied Biology/Chemistry	2	0

Substantial changes have also occurred in occupational/technical courses. High schools were engaged in such changes in Agriculture, Applied Science, Business, Engineering Technology, Health and Mechanical/Industrial areas. These changes involved both new instructional methods and more advanced skills. At Mt. Hood Community College changes occurred in Business, Engineering Technology, and Mechanical/Industrial.

Articulation

No written articulation agreements existed between secondary and postsecondary institutions prior to the Consortium's establishment. Seven general articulation agreements and 71 specific articulations agreements now exist. The articulation agreements with Mt. Hood Community College involve the following five elements:

- Identification of secondary courses or competencies for which postsecondary credits will be granted towards a certificate or degree

- Changing the content or competencies covered in postsecondary courses that are part of an occupational sequence to eliminate gaps or duplication

- Defining/changing the content or competencies covered in secondary courses that are part of an occupational sequence

- Granting of advanced standing in apprenticeship programs based on secondary school program completion

- Working with secondary partners to identify a sequence of required and elective courses or competencies at secondary and postsecondary levels to create a four-year program of study.

Articulation agreements have been signed in 15 areas: Accounting, Agriculture/Horticulture, Automotive, Cable and Commercial Television, Computer Applications, Early Childhood Education, Electronics, Engineering Technology (Drafting), Entrepreneurship/Small Business Management, Hospitality/Tourism, Journalism, Manufacturing Technology, Marketing, Office Occupations, and Welding Technology.

Counseling, Guidance, and Career Development

The Mt. Hood Consortium believe that an effective Tech Prep effort includes involvement of middle schools. Last year, meetings were held at middle schools involving Consortium staff, middle school and high school staff, students and representatives of postsecondary institutions, business, labor, government, local community organizations, and members of the armed forces.

Numerous career development activities were held at the middle school, high school, and postsecondary level. Table 5 lists a variety of career development activities and indicates which are provided by Some (S) or All (A) schools at that level or areas within the Mt. Hood Community College. A total of 51 counselors are available at the secondary level.

Table 5
Career Development Activities at the Middle, High School, and Postsecondary Level Provided by Some (S) or All (A) Schools or Areas within Mt Hood Community College

Career Development Activity	Middle School	High School	Mt. Hood CC
Special career development classes	A	A	S
Career development integrated in academic and/or vocational courses	A	A	S
Individual career development counseling	A	A	S
Special career counseling materials developed specifically for Tech Prep students are used by school counselors	A	A	S
Development of Tech Prep educational plans indicating courses a student will take at the secondary and postsecondary levels	A	A	S
Student access to or use of career exploration software	A	A	S
Trips to employer worksites	S	S	S
Job placement assistance for existing students provided by course instructors	S	S	S
Job placement assistance for existing students provided by guidance counselors	S	S	S
Job placement assistance for existing students provided by special job placement staff	S	S	S

Staff Development

Staff development was one of the most active parts of the Mt. Hood Tech Prep Program this year. The staff development involved many people including: consortium staff; secondary administrators, teachers, and counselors; postsecondary administrators, teachers, and counselors, and representatives of local business/industry. While improvement of job placement assistance received only moderate emphasis, heavy emphasis was placed on the following areas:

- Developing general concepts and strategies for Tech Prep
- Improving integration of vocational and academic instruction
- Developing curricula and instruction to promote hands-on learning
- Promoting cooperation among secondary and postsecondary staff
- Improving career development counseling
- Promoting Tech Prep and marketing it to students/parents
- Evaluating Tech Prep
- Improving business/industry/labor relationships

Student Outcomes

All seven districts in the Consortium have graduated Tech Prep students. The first group to have received articulated credit into Mt. Hood Community College graduated from high school in 1987-88. Approximately 1,500 Tech Prep students graduated last year. At this time we do not know the number who are currently employed. A study is currently underway to determine the number of high school Tech Prep graduates who entered Mt. Hood Community College this year.

Monitoring/Evaluation

Since the Mt. Hood Community College Consortium received special funding this year from the U.S. Department of Education as one of nine Tech Prep National demonstration Centers, the evaluation of this project has received special attention. The external evaluation is being performed by contract to the Northwest Regional Educational Laboratory (NWREL). The NWREL staff are working with the institutional research staff at Mt. Hood Community College to develop a computerized database containing information on past, current, and future Tech Prep students. When the database is implemented, it will include information on academic and vocational courses taken/completed, technical skills/competencies attained, course grades, career counseling services received, level of postsecondary remediation required, program enrollment by occupational area, degrees/certificates received, workplace experiences as part of Tech Prep, postsecondary job placement, and wage data from state unemployment records.

Data collection included interviews with key people, small group discussion with consortium staff and teachers, and written surveys of all 11th and 12th grade students in each of the seven districts to determine their vocational and educational plans, awareness of Tech Prep, and potential interest in entering specific occupational programs at Mt. Hood Community College.

Areas of Success and Obstacles

Among the areas where Consortium members perceived the most success were collaboration between secondary and postsecondary educators and collaboration between vocational and academic educators. Other success areas cited included developing administrators support, establishing clearly defined Tech Prep objectives, developing articulation agreements, obtaining a high degree of federal support, involving business and industry, networking with other Tech Prep programs, developing increased awareness of Tech Prep in the community, integrating Tech Prep into larger reform efforts, applying TQM, and developing inter-district programs that allow students from one district to take courses offered in other districts.

The greatest obstacle was the lack of staff, time, and money dedicated to Tech Prep.

3. CONSORTIUM STUDENT SURVEY

In May 1993, the NWREL evaluation staff prepared a Mt. Hood Consortium Student Survey that was reviewed by the consortium and project staff. It was then distributed by the regional coordinator to all available 11th and 12th grade students in the Consortium. The intent of the survey was to determine students' educational and vocational plans after high school, vocational programs taken in high school, interest in attending a community college and possible areas of vocational education interest there, familiarity with Tech Prep and perception of it, and whether students were aware of and had applied to have their high school vocational education credits transcripted to a community college. The results of this survey, which was completed by 2,391 students, are shown in a tabulated version in Appendix A.

The 2,391 students completing this survey were evenly distributed by gender and split between 11th and 12th grade. The largest number of respondents came from David Douglas High School. Table 6 shows the breakdown of number and percentage of students across the eight schools.

One year after completing high school the majority of students plan to attend a community college (47 percent), attend a four-year college or university (41 percent), or work part-time (38 percent). The most commonly mentioned jobs were in the areas of marketing, health occupations, and office occupations. Only 31 percent had ever considered a career in a non-traditional occupation. In terms of educational aspirations, 64 percent of the students intended to complete a four-year college degree or higher, while 22 percent planned to complete at least a two-year program.

Table 6
Number and Percentage of Students Responses by High School

School	Number	Percentage (of total respondents)
David Douglas	536	22
Sam Barlow	456	19
Reynolds	442	18
Centennial	329	14
Sandy	222	9
Gresham	166	7
Parkrose	162	7
Corbett	71	3

Students were asked to identify the high school professional technical education courses they have or are taking in high school. The most frequently mentioned course was early childhood education. Table 2 shows the distribution of other courses taken in high school, as well as the percent desiring to follow up with this course of study at a community college. The high school and community college percentages are rather similar; however, the percentages at the community college are generally slightly lower, except in the health occupations where 8 percent were taking them in high school while 12 percent were expressing interest in taking them in the community college. The similarities between the high school and community college are useful to know and suggest a good basis for Tech Prep articulation.

Table 7
Professional Technical Education Courses Taken in High School and Desired in a Community College

Course	Percent H.S.	Percent Com. Col.
Early Childhood Education	12	9
Automotive	9	6
Graphics	9	5
Marketing	9	6
Office Occupations	9	7
Health Occupations	8	12
Electronics	7	7
Hospitality/Tourism	6	6
Building Construction	4	4
Horticulture	1	2

Two-thirds of the students have considered attending a community college. The community colleges identified most often were Mt. Hood (59 percent), Portland (12 percent), Clackamas (8 percent), and others (6 percent).

While two-thirds of the students had thought about attending a community college, only one-third were familiar with the professional technical education courses offered at Mt. Hood Community College. Of those familiar with the professional technical education courses at Mt. Hood Community College, the most frequent sources of information were the school catalog (16 percent), friends (13 percent), and teachers and counselors (10 percent each). Only 7 percent indicated that they had visited Mt. Hood Community College. This suggests that an important recruiting strategy to get high school students familiar with the Mt. Hood Community College program may be to arrange for them to visit the campus.

In this survey only 25 percent of the students had ever heard of Tech Prep. Most of that number felt that Tech Prep either consisted of courses which prepared students for careers in technical fields (14 percent) or it was a professional technical education program that starts in high school and leads to a community college associate degree or beyond (15 percent). High school students in the Seattle School District were also asked about Tech Prep in May. Twenty-eight percent of the 11th and 12th grade students there had heard about Tech Prep. This suggests that many students still need to be informed about Tech Prep.

The last set of questions dealt with transcripting of professional technical education high school course credits into the community college. Fifty-nine percent were aware that their professional technical education classes may count for community college credit, but only 18 percent had ever applied to have the credits transcripted.

A more detailed analysis was made of the 1,135 high school students who indicated an interest in attending Mt. Hood Community College. Table 8 shows the number of these students expressing an interest in particular occupational areas at Mt. Hood. Of this group only 36 percent expressed familiarity with the professional technical education courses offered, 25 percent had heard of Tech Prep, 62 percent were aware that their professional technical education high school classes may count for community college credit, but only 20 percent had applied to have their credits transcripted.

A detailed report will be provided to the project staff identifying by name each student who indicated an interest in attending Mt. Hood Community College. This report will provide the student's school, grade level (11th or 12th), occupational areas of interest at Mt. Hood, and occupational areas studied in high school.

Table 8
Number of High School Students Interested in Taking a Professional/Technical Education Program at Mt. Hood Community College

Occupational Area	Number
Automotive	102
Building Construction	71
Early Childhood Education	170
Electronics	127
Graphics	87
Health Occupations	200
Horticulture	31
Hospitality/Tourism	115
Marketing	102
Office Occupations	130
TOTAL	1135

4. ARTICULATION STUDY

Introduction

In May 1994, Dr. Tom Owens of the Northwest Regional Educational Laboratory in cooperation with Dr. Dan Walleri, director of Research and Planning at Mt. Hood Community College, and Nancy Conrath, a consultant to the community college, conducted an analysis of records of students enrolled in one or more professional technical education courses at Mt. Hood. The intent was to study students who had taken professional technical education courses in high school and had received articulated credit from Mt. Hood for one or more such courses. Comparison group students were selected based on not having transcripted credits, but being enrolled in the same community college professional technical education courses as those who had transcripted credits.

We wished to describe the characteristics of the professional technical education students who had transcripted professional technical education credits as a baseline for measuring future Tech Prep students. The indicators we used were: grade point average at Mt. Hood Community College and the percent of students needing guided studies in reading, mathematics, and/or writing. Other descriptive data we analyzed were: gender, ethnicity, educational goals of the students, and motivation for attending Mt. Hood Community College.

Findings

There were 1550 students for whom transcript data were available from Mt. Hood Community College. Table 9 shows the number of students in each of the three groups by the number of community college credits they had accumulated at Mt. Hood. We decided to eliminate from further analysis those students who had taken less than 12 hours of credit at the college since many had taken only one or no courses. It is interesting to note that both the PTE groups had a higher percentage of students who had taken more than 11 hours of credit.

Table 9
Number of Students by Credits Earned at Mt. Hood Community College
N=1,550

Category of Students	No hours	One to 11 hours	12 to 20 hours	21 or more hours	Total
Comparison	820	432	68	116	1,436
PTE 1	0	11	11	32	54
PTE 2	1	6	6	47	60

For the following tables the following factors apply: (1) The information is based on years 1988-1993; (2) Only students earning a total of more than 12 credit hours were included; (3) PTE1 students are professional technical education students from the following majors General Studies, Criminal Justice Administration, Nursing-PreProf, and Business Administration, (4) PTE2 students were all the professional technical education majors except General Studies which is included in PTE1 (these are the students who traditionally would have been identified as professional technical education students because they were in programs that do not transfer to four-year degree programs); (5) For both PTE categories only those students who were involved in the 2+2 program and actually transcripted credit were included.

Table 10 shows the age distribution of students in the three groups. This was considered important to determine whether the comparison group were substantially older than the other two professional technical education groups. As seen in Table 10, there are some older students in the comparison but 149 students or 81 percent are under 25 years of age.

Table 11 shows the average grade point average for students in the three groups. Those who had not transcripted credits had a somewhat higher GPA than other professional technical education students.

Table 10
Age of Students by Group
(N=279)

	Comparison (N=183)	PTE1 (N=43)	PTE2 (N=53)
17-21	89	36	41
22-25	60	7	11
26-29	12	0	1
30-40	12	0	0
41-50	7	0	0
Over 50	3	0	0

Table 11
Mean GPA by PTE Status
(N=280)

	Comparison (N=184)	PTE1 (N=43)	PTE2 (N=53)
GPA	2.20	1.95	1.80

Differences in gender are shown in Table 12. Students who transcripted their high school professional technical education credits were more likely to be female. This finding has occurred with other Tech Prep programs in other parts of the country. It is not clear exactly why females are more likely to transcript their credits. In at least some of the Mt. Hood Consortium high schools the business and office occupations teachers have been more directive in bringing the forms to be filled out into the classroom for students to complete while other professional technical education teachers have left it up to the individual student to do on their own.

Table 12
Gender Percentages by PTE Status
(N=280)

	Comparison (N=184)	PTE1 (N=43)	PTE2 (N=53)
Female	65	70	85
Male	35	30	15

The ethnic background of the three groups is shown in Table 13. Most of the students in each group are Caucasian with a slightly higher percentage being in the PTE2 group.

Table 13
Ethnic Percentages by PTE Status
(N=280)

	Comparison (N=184)	PTE1 (N=43)	PTE2 (N=53)
American Indian	1	2	0
Black Afro-American	1	0	0
Caucasian	89	88	94
Oriental-Asian	6	7	6
Spanish Surnamed American	2	2	0
Non-US Citizen	1	0	0
Unknown	1	0	0
Other	2	0	0

Upon applying at Mt. Hood Community College, students are asked to identify their educational goals. Table 14 shows the distribution by group. As would be expected, the PTE2 group has the highest percentage who aspire to a 2-year degree while the PTE1 group has the highest percentage aspiring to the 4-year degree. What is interesting, however, is that 15 percent of the PTE2 group want to earn a 4-year degree and 30 percent of the PTE1 group want only a 2-year degree. This suggests that it may be more useful in the future to consider both groups as professional technical education students and not limit professional technical education to only those not intending to go beyond a 2-year degree.

Table 14
Goal Percentages by PTE Status
(N=272)

	Comparison (N=176)	PTE1 (N=43)	PTE2 (N=53)
Take one class	6	0	2
Take a few classes	4	0	0
Earn a 2-year degree	23	30	79
Earn 1-year certificate	2	0	4
Earn GED 3	0	0	0
Earn 4-year degree	58	70	15
Other	7	0	0

Students upon entry into Mt. Hood Community College are also asked to identify their motive for entering the community college. Table 15 shows the results. The largest percentage of the PTE2 students enroll to get a job while the largest percentage of the PTE1 group enroll to explore a career.

Table 15
Motive Percentages by PTE Status
(N=271)

	Comparison (N=171)	PTE1 (N=42)	PTE2 (N=53)
Get a job	16	17	43
To enhance my current job	3	2	0
Get a better job	14	12	17
Personal enrichment	9	5	4
Explore a career	41	62	30
Other	16	2	6

Students entering Mt. Hood Community College take the CPT Placement test in reading, writing and mathematics. Cut scores have been set at 110 in reading, 319 in writing and 17 on the mathematics test A/SK. Students scoring equal to or lower than these cut scores are required to take guided studies classes in the respective areas to prepare them to handle the higher level courses required at Mt. Hood Community College. Tables 16, 17, and 18 show the percentage of students needing guided studies in each of the three areas separately while Table 19 shows those needing guided studies in more than one area. For each of the three basic skills areas those students in PTE2 had the highest percentage needing remediation. The figures for writing are especially high for all groups. Table 19 indicates that 91 percent of the PTE2 group needed guided studies in at least one basic skills area.

Table 16
Percentage of Students Needing Guided Studies in Reading by PTE Status
(N=155)

	Comparison (N=76)	PTE1 (N=35)	PTE2 (N=44)
GS	7	9	20

Table 17
Percentage of Students Needing Guided Studies in Math by PTE Status
(N=155)

	Comparison (N=76)	PTE1 (N=35)	PTE2 (N=44)
GS	13	9	30

Table 18
Percentage of Students Needing Guided Studies in Writing by PTE Status
(N=155)

	Comparison (N=76)	PTE1 (N=35)	PTE2 (N=44)
GS	17	20	27

Table 19
Percent of Students Needing Guided Studies in More Than One Area
(N=155)

	Comparison (N=76)	PTE1 (N=35)	PTE2 (N=44)
Reading/Math	3	0	14
Reading/Writing	4	9	16
Math/Writing	7	6	14
Reading/Math/Writing	1	0	11
None needed	75	76	55

Tables 20 and 21 show the percent of PTE1 and PTE2 students needing guided studies in each of the three basic skills area for the past three years for which data are available. Analysis was run over the years to see if the pattern was changing over time. Since the numbers are small for 1990 it is more reliable to consider the 1991 and 1992 years. There appears to be no pattern yet. With the comparison group there appears to be a slight decrease in those needing guided studies in writing over the three years from 100 percent to 82 percent.

Table 20
Percentage of PTE1 and PTE2 Students Needing Guided Studies by Year of High School Graduation

	1990		1991		1992	
	PTE1 (N=2)	PTE2 (N=6)	PTE1 (N=12)	PTE2 (N=13)	PTE1 (N=20)	PTE2 (N=24)
Reading	0	50	25	15	0	17
Math	0	50	0	23	15	25
Writing	0	67	25	23	20	21

Table 21
Percentage of Comparison Group Students Needing Guided Studies by Year of High School Graduation

	1990 (N=10)	1991 (N=19)	1992 (N=22)
Reading	10	5	5
Math	20	0	18
Writing	10	11	32

5. EVALUATION RECOMMENDATIONS

The evaluation of this project has produced some important outcomes including the formation of an active evaluation advisory committee, an evaluation design that has been reviewed by the advisory committee and revised, a set of working definitions of high school and community college Tech Prep students, formation of a national review panel of nationally recognized experts in Tech Prep, a comprehensive description of the project and its operations, start-up work on designing an effective student management information system and transcript study, and a survey of almost 3,000 high school 11th and 12th grade students enrolled in professional technical education.

There are three evaluation recommendations that seem important for the future.

1. **More intensive work is needed in increasing the awareness and understanding of Tech Prep among students, staff, parents, and employers.**

Data from the Consortium Student Survey administered to 2,391 11th and 12th grade students in May 1993 indicated that of the students surveyed, only 25 percent indicated that they had ever heard the term "Tech Prep", and only 15 percent thought of it as a professional technical education program that starts in high school and leads to a community college associate degree or beyond.

While it is useful not to make a major distinction between Tech Prep and College Prep, since some students will be qualifying for both, it appears important that students know about Tech Prep and be encouraged, through individual student plans, to think about how they can continue their professional technical education beyond high school into the community college. The Consortium Student Survey recorded student names, schools, and professional technical education areas of coursework for almost 3,000 high school students. It may be useful next year for each school to follow up with these seniors or recent graduates to explain Tech Prep and encourage students to continue their training in community college

2. **There is need to have a better system for identifying professional technical education program completers and Tech Prep students so that next year's evaluation can look at gains in the number of Tech Prep students versus the number of other students.**

A review of the high school SERVE reports completed by the schools suggests that there is a gross underestimation of professional technical education program completers and Tech Prep students. For example, the SERVE report from one advanced marketing class of 11th and 12th grade students indicated that none were in Tech Prep. This appears highly unlikely. Professional technical education teachers know the students in their current classes, but they often do not know what is required of a program completer nor the actual courses in professional technical education that each student has already completed. The Consortium may want to identify a committee of educators to investigate this problem and come up with recommendations that can be tried and assessed next year.

3. **Work should continue on developing a student management information system that includes an analysis of the professional technical education courses completed by each student so that we will have a sound basis for identifying the Tech Prep students.**

The NWREL evaluation staff have held several productive meetings this year with the director of admissions and the director of institutional research at Mt. Hood Community College to determine what student information is available on professional technical education students at Mt. Hood and to decide how that information can be used in the evaluation. These discussions need to continue next year and expand to include representatives of some of the participating high schools. The student MIS should be compatible with the one being developed by the Oregon Department of Education.

APPENDIX A
MT. HOOD CONSORTIUM STUDENT SURVEY
PERCENT (N=2,391) RESPONSES

Gender: *(check one)* Male 51% Female 49%

Grade Level: *(check one)* 11th 51% 12th 49%

High School: *(check one)*	%	N
Centennial	14	329
Gresham	7	166
Corbett	3	71
Parkrose	7	162
David Douglas	22	536
Reynolds	18	442
Sam Barlow	19	456
Sandy	9	222

The following questions are designed to help us prepare high school and community college classes that meet the needs of today's students. Please take a few minutes to complete this survey and return it to your teacher.

1. What do you expect to be doing one year after completing high school? *(Circle one or more numbers.)*

	Percent
Working full-time (35 hours or more)	18
Entering an apprenticeship program	4
Entering an on-the-job training program	4
Going into regular military service or to a service academy	6
Attending a vocational, technical, trade or business school	9
Attending a community college	47
Attending a four-year college or university	41
Working part-time (less than 35 hours)	38
Other (travel, take a break)	9
I have no idea what I'll be doing	4

2. What type of job do you think you will have when you are 30 years old. *(Be as complete as you can.)*

	Percent
Automotive	5
Construction	7
Early Childhood	9
Electronics	2
Graphics	3
Health Occupations	18
Horticulture	16
Hospitality/tourism	4
Marketing	59
Office Occupations	12
Other	66

3. Have you ever considered a career in an occupation that is non-traditional for your gender? (i.e., a male nurse or female engineer) Yes 31% No 69%

4. As things stand now, how far do you think you will get in school? *(Circle the highest applicable number.)*

	Percent
High School	
Less than high school graduation	2
High school graduation only	3
Vocational, trade, or business school after high school	
Less than two years	3
Two years or more	5
College or Community College	
Less than two years of college	4
Two or more years of college (including two-year degree)	22
Finish college (four- or five-year degree)	33
Master's or advanced degree	31

5. Have you taken or are you currently enrolled in any of the following high school professional technical education courses? *(Check all that apply.)*:

	Percent		Percent
Automotive	9	Health Occupations	8
Building Construction	4	Horticulture	1
Early Childhood Educ.	12	Hospitality/Tourism	6
Electronics	7	Marketing	9
Graphics	9	Office Occupations	9
Others(please specify)	25		

6. Have you ever thought about attending a community college after completing high school to continue your training in a professional technical area?
Yes 66% No 34%

If yes, which community college are you likely to attend? *(Circle one or more numbers.)*

Mt. Hood Community College	59
Portland Community College	12
Clackamas Community College	8
Other (please specify)	6

7. If you plan to take a professional/technical program in a community college, in what occupational area would you like to receive training? *(Check one.)*

	Percent		Percent
Automotive	6	Health Occupations	12
Building Construction	4	Horticulture	2
Early Childhood Educ.	9	Hospitality/Tourism	6
Electronics	7	Marketing	6
Graphics	5	Office Occupations	7
Others(please specify)	22		

8. Are you familiar with the professional technical education courses offered at Mt. Hood Community College?
Yes 33% No 67%

If yes, how did you hear about them? *(Circle all that apply.)*

I learned about them from:	Percent		Percent
School catalog or course listing	16	A counselor	10
Friends	13	Staff at Mt. Hood Community College	5
High school teachers	10	I visited Mt. Hood Community College	6
Other (please specify)	4		

9. Have you ever heard the term "Tech Prep"?
Yes 25% No 75%

If yes what do you think **Tech Prep** means *(Circle one or more numbers.)*

A new name for vocational education	3
Courses to prepare you for careers in technical fields	14
A professional technical education program that starts in high school and leads to a community college associate degree or beyond	15
Preparation for a job immediately after high school	3
Courses in computer sciences	1
I'm not sure	7

10. Were you aware that your professional technical education high school classes may count for community college credit? Yes 59% No 41%

If yes, have you ever applied to have your credits transcripted to a community college?
Yes 18% No 82%

Northwest Regional Educational Laboratory
Education and Work Program
101 S.W. Main Street, Suite 500
Portland, Oregon 97204
Telephone (503) 275-9500

THANKS FOR TAKING TIME TO COMPLETE THIS SURVEY.

Appendix E

TOTAL DISSEMINATIONS / VISITATIONS TO DATE

with state-by-state reports

(Does not include 1994 AVA National Convention materials.)

MHCC NATIONAL TECH PREP DEMONSTRATION CENTER

DISSEMINATIONS / VISITATIONS

As of November 14, 1994

State	Visitations	Materials
Alaska	--	3
Alabama	--	6
Arkansas	--	11
Arizona	4	18
California	7	48
Colorado	2	17
Connecticut	--	1
Delaware	--	4
Florida	1	23
Georgia	--	10
Hawaii	2	7
Iowa	1	15
Idaho	--	3
Illinois	--	39
Indiana	--	10
Kansas	--	14
Kentucky	--	12
Louisiana	3	5
Massachusetts	--	11
Maryland	1	6
Maine	--	3
Michigan	--	12
Minnesota	1	15
Mississippi	--	7
Missouri	--	23
Montana	3	8
Nebrasks	--	3
Nevada	1	6
New Hampshire	--	8
New Jersey	--	8
New Mexico	--	3
New York	--	16
North Carolina	1	8
North Dakota	--	5
Oklahoma	1	6
Ohio	--	20
Oregon	1	16
Pennsylvania	--	10
Rhode Island	1	4
South Carolina	1	9
South Dakota	--	7
Tennessee	--	17
Texas	2	41
Utah	--	7
Virginia	1	16
Vermont	--	3
Washington	6	28
Wisconsin	1	10
West Virginia	--	5
Wyoming	1	4
Washington DC	--	5

OUT OF COUNTRY:

Country	Visitations	Materials
Palau	--	4
Yugoslavia	--	1
New Zealand	6	6
Australia	2	2
Virgin Islands	--	2
Micronesia	--	1
Guam	--	1
British Columbia	--	2
England	--	2
Canada	--	3

TOTAL VISITATIONS*: **52**

(*Groups ranged from 1 to 50 individuals)

Estimated MATERIALS DISSEMINATED

From MHCC: 620

PLUS additional 200 at '93 AACC booth, 300 at '93 AVA booth, 450 at '94 AACC booth, and 400 at '94 AVA booth: 1,350

PLUS additional 800+ pieces of information disseminated through Consortium presenters at a variety of workshops, round table discussions, and other conference sessions: + 800

TOTAL MATERIALS DISSEMINATED: +2,770

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Alaska

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Karen Steinman, Instructor East High School 4025 E. Northern Lights Anchorage, AK 99508	11/93										x		
Jean Marcey P.O. Box 1343 Palmer, AK 99645	11/93										x		
Howard Lowery, Trainer Lowery Ed/Tech Services HC31 Box 5205 Wasilla, AK 99654	11/93										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Alabama

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Pat Edwards, Ed.D. Tuscaloosa City Schools Tuscaloosa, AL	4/92		x								x		
Carmine Ruocco Jefferson State Birmingham, AL	5/91										x		
Thomas Rhodes, Direc. VocEd Baldwin County Bd. of Ed. 175 Courthouse Square Bay Minette, AL 36507	11/93										x		
Arthur Brown, Special Coord., VocEd Birmingham City Schools P.O. Drawer 10007 Birmingham, AL 35202	11/93										x		

BEST COPY AVAILABLE

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Arkansas

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Tommye Lou Jones Phillips County Community College Helena, AR	1/93										x		
Dr. Zoe Morgan Westark Community College Fort Smith, AR	12/91										x		
Mary Ann Wing Westark Community College Fort Smith, AR	4/92										x		
Jolene Highfill, VocEd Dir/TP Coord Rogers Public Schools 1114 South 5th St. Rogers, AR 72756	4/93										x		
Cathy William, Instructor 2901 Kinkead Ft. Smith, AR 72901	11/93										x		
Elizabeth Franchiseur, Instructor DeQueen H.S. Rt. 4 West Coulter Dr. De Queen, AR 71832	11/93										x		
Mary Bell, Instructor Jacksonville Jr. High North 201 Sharp Street Jacksonville, AR 72076	11/93										x		
Barbara Hunter, Admin. Asst. Osecola Public School Dist. 1 P.O. Box 628 Osceola, AR 72370	11/93										x		
Charles Bruce Pine Bluff High School 711 W. 11th Pine Bluff, AR 71603	10/93										x	All	

2+2 TECH PREP PROGRAM

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Dr. Lois E. Wells Arkansas State University 213 E. Sixth Street Mountain Home, AR 72653											x	x	
Karen Chisholm Arkansas State U. PO Drawer H Beebe, AR 72012-1008											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Arizona

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Dr. John P. Durbin Agua Fria Union High School Avondale, AZ	3/93											x	HB 3565
Naila Erwin Estrella Mountain Community College Litchfield Park, AZ	1/93		x	x		MHCC, Centennial, David Douglas	19	1			x		
Nancy Kitchell Santa Fe Community College Santa Fe, AZ	9/92										x		
Jackie Parrish Mohave Community College Kingman, AZ	12/92										x		
Perry W. Sublette, Director Guidance & Counseling 12000 W. Emigh Rd. Tucson, AZ 85743	7/93										X	X	All
Gary L. Filan, Executive Director National Community College Chair Academy; 1833 W. Southern Ave. Mesa, ZA 85202	7/93										X	X	All
Dr. Russell De Vriendt, Dean of Ins. Arizona Western College P.O. Box 929 Yuma, AZ 85366-0929	7/93					(602) 344-7519; FAX (602) 344-7730					X	X	Counseling Pkt.
Jack Peterson, Conf. Program Ch. National CC Chair Academy 1833 West Southern Ave. Mesa, AZ 85202	11/93										x		
Jim Meyers, Instructor Chandler High School 350 N. Arizona Avenue Chandler, AZ 85224	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Barbara McClurg Yavapai College Prescott, AZ 86327											x	x	
Dan Bridges Paradise School District 3950 E. Bell Road Phoenix, AZ 85032	2/28, 3/1			x		MHCC & high schools	10						
Dr. Karen Nicodemus Cochise College Rt. 1, Box 100 Douglas, AZ 85607											x	x	
Dr. Doreen Dailey, President Yavapai College Prescott, AZ 86327											x	x	
Francis Morris AZ Western College P.O. Box 969 Yuma, AZ 85366											x	x	
Gary Passer Northland Pioneer College PO Box 210 Holbrook, AZ 86025											x	x	
Russell DeVriendt Dean of Instruction POB 929 Yuma, AZ 85366-1929											x	x	
John Fry Scottsdale Community College Scottsdale, AZ	9-29/30-94			x		MHCC and high schools					x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: California

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
CA Community College Conference San Francisco, CA	10/91				x			1	Miller	Conference - SF			Conference speaker
Robert Castano Golden West College Huntington Beach, CA	11/91											x	Guidelines sent; Advisory Committee info.
David McGreavy San Diego Community College Dist. San Diego, CA	1/92										x		
Jim Newman Baldy View Regional Occup. Program Claremont, CA	1/93										x		
Michael O'Leary Shasta Union High School Redding, CA	11/92										x		
Phil Osborne Los Angeles Pierce College Woodland Hills, CA	11/91											x	MHRCC Annual Report
Dr. Henry Padden State Center Community College Fresno, CA	11/91			x		MHCC						x	MHRCC Annual Report
Dr. Victoria Patterson Mendocino College Ukiah, CA	1/93										x		
Darlene Perez Fairfield High School Fairfield, CA	11/91											x	MHRCC Annual Report

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Carl Peterson Kelsyville Unified Schools Fairfield, CA	1/93										x		
Blaine Russell Yuba College Marysville, CA	11/91											x	MHRCC Annual Report
Dr. Cecilia Skinner Mill Valley, CA	11/91											x	MHRCC Annual Report
Anne Stewart Santa Barbara City College Santa Barbara, CA	9/91										x		
Catherine Clarke Stoll San Diego Community College San Diego, CA	11/91											x	MHRCC Annual Report
Esther Thomas Yolo County Supt. of Schools Woodland, CA	11/91											x	MHRCC Annual Report
Sally Tollison Glenn County Office of Education Willows, CA	11/91											x	VIP Video Tape
National Assn. Secondary School Principals Conference San Francisco, CA	2/92								Miller /Dixon	Conference in SF			Conference Speakers
Rich Montori Monterey Penninsula College 980 Fremont Street Monterey, CA 93940	2/92										x		
Carl Petersen Kelseyville High School P.O. Box 308 Kelseyville, CA 95451	3/93 5/93			x		MHCC, Consortium, David Douglas					x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Laurel Adler East San Gabriel Regional Occu. Program 1024 West Workman Avenue West Covina, CA 91790	4/93			x		MHCC, David Douglas		1			x		
Judy Collet, Tech Prep Coord. 13947 Birch Rd. Grass Valley, CA 95945	5/93	x									x	x	Articulation agreement
Joana Fisch, Outreach Mgr. FASE Productions 4801 Wilshire Blvd., S-215 Los Angeles, CA 90010	5/93					(213) 965-8794 (213) 965-0608					x		
Dr. David Bochman, Dean of Inst. College of Sequoia 915 Mooney Visalia, CA 93277	7/93		x								x	x	all packets of information
Dr. Steve Cragg, VP Inst. Serv. Shasta College P.O. Box 496006 Redding, CA 96049-6006	11/1	x		x		MHCC, Centennial, David Douglas tele: 916-225-4901 FAX 916 225-4990	30	1			x	x	all packets of information
Charles Hayden, TP Director Board of Trustees, Coll.of Desert 66938 San Felipe Desert Hot Springs, CA 92240	11/93										x		
Rogert Knight, Manager, VT Ed. Apple Computer Inc. 900 E. Hamilton Ave., MS 73X Campbell, CA 95008	11/93										x		
Barbara Churchill, Instructor Oakland Public Schools 1025 Second Ave., P-14 Oakland, CA 94606	11/93										x		
Ruby Trwo, Professor, F+N+Home Econ. Cal Poly, Pomona 3801 W. Temple Pomona, CA 91768	11/93										x		
Beth Fisher, VP Connors Communications 665 Chestnut St., 3rd Floor San Francisco, CA 94133-2305	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Jim Comiskey, President Academic Innovations 3463 State St., Suite 219 Santa Barbara, CA 93105	11/93										x		
Kathy Reeves, NCRVE 2150 Shattuck, Suite 1250 Berkeley, CA 94704	1/94										x		
Dee Porter East San Gabriel Valley ROP 1024 W. Workman West Covina, CA 91791	1/94										x		
Yancey Juergenson Modesto Junior College 435 College Avenue Modesto, CA 95350	11/93										x		
Madelene Wong, TP Director Ohlone College 43600 Mission Blvd. Fremont, CA 94539	2/94										x	All	
G. B. Perry, Area Coord. Yosemite Tech Prep Consortium 65 Briarwood Drive Sonora, CA 95370-8865	10/93										x	All	
Charles Hayden College of the Desert 66938 San Felipe Desert Hot Springs, CA 92240											x	x	
Cruz Rangel Cesar Chavez Center, SDCCD 1960 National Ave. San Diego, CA 92113-2116											x	x	
Don Gilmore East County Tech Prep Coord. 181 Fletcher Parkway El Cajon, CA 92020	7\7			x		MHCC, high schools					x	x	
Dr. Donald Donato Feather River CC District POB 11110, 570 Golden Eagle Ave. Quincy, CA 95971											x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Dr. Sam Schauerman El Camino College 16007 Crenshaw Boulevard Torrance, CA 90506-0002											x	x	
Dr. Alex Sanchez Rio Hondo Community College Dist. 3600 Workman Mill Road Whittier, CA 90608											x	x	
Ellie Tymer El Camino College 16007 Crenshaw Blvd. Torrance, CA 90506-0001											x	x	
Eloise Cantreel Mission College 13356 Eldridge Sylmar, CA 91342											x	x	
June Kitchel 954 Damato Drive Covina, CA 91724											x	x	
Ken San Filippo 1530 Lizzie Street San Luis Obispo, CA 93401											x	x	
Paul Kelley Palomar College 1140 W. Mission Road San Marco, CA 92069-1487	6/7			x		MHCC & high schools					x	x	
Steve Pavich Newport Harbor High School 600 Irvine Newport Beach, CA 92663											x	x	
William Flynn Palomar College 1140 W. Mission Road San Marcos, CA 92069-1487											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Colorado

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Don English Colorado Comm. Colleges & Occup. Ed. System Office Denver, CO	4/92										x		
Ray Greb Mesa State College/UTEC 2508 Blichmann Grand Junction, 81505 (303)248-1755	5-92	x		x		MHCC	1	1			x		
Gayle Mahler, Coord., West Campus Front Range CC 3645 112th Avenue Westminster, CO 80030	5/93										x		
Don Scheel Builder Tech 6600 Arapahoe Boulder, CO 80303	11/93										x		
Jerry Allen 1400 Pioneer Road Delta, CO 81416	11/93										x		
Tod Anderson, Instructor Durango High School 2390 Main Street Durango, CO 81301	11/93										x		
Kathy Kenefick P.O. Box 3295 Durango, CO 81302	11/93										x		
Lynne Walters, Bus. Dept. Durango High School P.O. Box 2467 Durango, CO 81302	11/93										x		
Lula Fay Cole, Treasurer Colorado Voc. Assn. 706 South 6th Lamar, CO 81052	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Betty Fry (Dr.), Professor, Bus/Mkt. Colorado State University 203 Education Building Fort Collins, CO 80523	11/93										x		
Lori Denny Pueblo Community College 900 West Orman Ave. Pueblo, CO 81004	9/93										x		
Gayle Mahler Front Range CC 3645 W. 112th Avenue Westminster, CO 80030	6/10/94			x		MHCC and high schools					x	x	
George Mihel CNCC 50 Spruce Drive Craig, CO 81625											x	x	
Jerry Pepple Weld County School Dist. 6 811 Fifteenth Street Greeley, CO 80631											x	x	
Marlene Hall Community College of Denver POB 173363 Denver, CO 80217-3363											x	x	
Gayle Mahler Front Range CC 3645 W. 112th Ave. Westminster, CO 80030	6/15/94 (303) 466-8811, ext. 348										x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Connecticut

Page 1

		CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		
REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	*COMMENTS
Captain Wendell Corey The Aquaculture Foundation Bridgeport, CT	1/92										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Washington, D.C.

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Waverly Jones Chamberlain Career Center 1345 Potomac Ave. SE Washington, D.C. 20003	11/93										x		
Alethna Spraggins, Principal MM Washington CHS 27 O Street, NW Washington, D.C. 20001	11/93										x		
Mary Ann Settlemire AACC 1 Dupont Circle, Suite 410 Washington, D.C. 20036	10/93										x		
Paul Briece Academy for Educational Dev. 1875 Connecticut Ave., NW Washington, D.C. 20009-1202											x	x	
Pauline Labrie Department of Energy Washington, D.C. 20585											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Delaware

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Henry Paige, Instructor Tech Prep 100 Denny's Road Dover, DE 19901	11/93										x		
Mimi Dupont, Acting TP Facilitator Delaware Technical & CC P.O. Box 660 Georgetown, DE 19947	11/93										x	All	
Dr. Marguerite Johnson Delaware Tech. & Community College 1832 North DuPont Parkway Dover, DE 19901											x	x	
Gwendolyn Sanders Delaware Tech 1832 N. DuPont Dover, DE 19901											x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Florida

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Rebecca Augustyniak Florida State University Tallahassee, FL	8/92										x		
Barbara Kryzier/Joyce Clark Valencia Community College Orlando, FL	12/91			x		MHCC	2	1			x		
Pamela Trelaez Seminole Community College Sanford, Fl.	1/93										x		
Tommy Taylor School Dist. of Escambia County 30 E. Texar Drive Pensacola, FL 32503	4/93										x		
George Diez, Clearinghouse Research. Florida State U.j, 251 Sliger Bldg. 2035 E. Dirac Dr. @ Innovation Park Tallahassee, FL 32310	7/93											x	Automotive Tech. program
A.F. Weigel, Dr., Drafting Brevard CC, Cocoa Campus 1519 Clearlake Road Cocoa, FL 32922	11/93										x		
George Tamalvich, Tech. Instr. William McFatter Voc-Tech Center 6500 Nova Drive Davie, FL 33317	11/93										x		
Patricia Becton Urban Resource Center, #402 Florida CC at Jacksonville Jacksonville, FL 32202	11/93										x		
June Harral, Teacher/Bus.Dept. Ch. Niceville High School 800 E. John Sims Parkway Niceville, FL 32578	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Ms. Anne Freeman, Home Ec Coord. School Dist. Escambia Cty. 30 East Texar Drive Pansacola, FL 32503	12/93										x		
Alexander DuBrow, VP, Sales Innovative Tech in Ed 6220 S. Orange Blossom Trail, #316 Orlando, FL 32809	11/93										x		
Frankie Hively, Cosmetol. Inst. Sarasota County Tech Institute 4748 Beneva Road Sarasota, FL 34233	11/93										x		
Sheila Tulis, Learning Manager, SAIL Sarasota Cty Technical Institute 4748 Beneva Road Sarasota, FL 34233	11/93										x		
Sandra Cassity, Direc. Tech Prep St. Petersburg Jr. College P.O. Box 13489 St. Petersburg, FL 38733	11/93										x		
Trudie Johnson, Indus. Serv. Coord Pinellas Technical Ed. Centers 901-34th Street South St. Petersburg, FL 33711-2298	11/93										x		
Dorothy Bouie, Dir. Home Ec. Florida Education Center, #1152-B 325 W. Gains Street Tallahassee, FL 32399	11/93										x		
Bill Blank, Instructor University of South Florida Bldg. FAO 100V-Rm. 226 Tampa, FL 33620	11/93										x		
Carol Singer Natl. Assn. for Assoc. Degree Nursing POB 1849 Bradenton, FL 34206											x	x	
Celeste Beck Palm Beach Community College 4200 Congress Avenue Lake Worth, FL 33461											x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Jeffrey Lukenbill Miami-Dade Community College 11380 NW 27th Ave. Miami, FL 33167											x	x	
Joan Tiller Valencia Community College POB 3028 Orlando, FL 32802											x	x	
Pamela Palaez Sem. Community College 100 Weldon Blvd. Sanford, FL 32773											x	x	
Tom Chappell Interlachen High School Route 1, Box 10 Interlachen, FL 32167											x		
Darryl Scott FL TP Clearinghouse 2035 E. Dirac Dr. Tallahassee, FL 32310	(808) 338-1670												

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Georgia

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Robbie Latimore, Instructor 728 Southerfield Road Americus, GA 31709	11/93										x		
Lois Brown, Program Specialist University of Georgia 104 Industrial Arts Bldg. Athens, GA 30602-4592	11/93										x		
Lynne Bottle, Instructor G. W. Carver High School 1275 Capitol Avenue Atlanta, GA 30315	11/93										x		
Candace Gentry, Representative Transportation Communications 1422 W. Peachtree St., #700 Atlanta, GA 30309	11/93										x		
Jeannette Lewallan, Instructor Franklin County High School Box 543 Carnesville, GA 30521	11/93										x		
Douglas Sharp, Director, TP/Voc. Green-Taliaferro H.S. 1002 South Main Street Greensboro, GA 30642	11/93										x		
Catherine Wilson, Home Ec. Dept. Stephens County High School Route 5, White Pine Rd. Taccoa, GA 30577	11/93										x		
Carolyn Rackley Educational Testing Service 1979 Lakeside Parkway, Suite 400 Tucker, GA 30084											x	x	
Roger Slater West GA. Tech 303 Fort Drive La Grange, GA 30240											x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Sue Friedman Heart of GA Tech. Institute Rt. 5, Box 136A-1 Dublin, GA 31021											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Hawaii

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Stephanie Sims Department of Education Honolulu, HI	10/92										x		
Dolores Donovan, Language Arts Honolulu Community College 874 Dillingham Blvd. Honolulu, Hawaii 96817 845-9211	6/92										x		
Joan Matsukawa Kapiolani Community College 4303 Diamond Head Rd. Honolulu, HI 96816 (808)734-9272	5/93			x		MHCC	2	1			x		
Nina Enomoto Native Hawaiian VocEd Program 2879 Paa Street Honolulu, HI 96819	12/93										x		
Kalau Hergenrader Kamahamaha High School Honolulu, HI	5/16/94			x		MHCC and high schools					x	x	
Gerald Hill Waimea High School P.O. Box 339 Waimea, HI 97696	6/94 (808) 338-1670			x		MHCC and high schools					x	x	
Terry Bruns, Instructor Kapaa High School Kapaa, HI	9/94 (808) 823-0439												

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Iowa

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Vickie Petsche Iowa Western Community College Council Bluff, IA	3/93 5/93			x		MHCC, Consortium, David Douglas		1			x		
Barbara Roeder Hawkeye Inst. of Technology Waterloo, IA	10/92										x		
Mary Malay, Transformation Consultant Lakeland Area Ed. Agency Hwy. 18 & 2nd, P.O. Box 38 Cylinder, IA 50528-0038	5/93										x	x	Articulation agreements
Dale Monroe, Principal Linn-Mar Community College Schools 3333 North 10th Street Marion, IA 52302	11/93										x		
Dave La Grange Prairie High School 401 76th Avenue, SW Cedar Rapids, IA 52404	1/94										x		
James Liang-Chih Huang, Indus. Ed/Tech Iowa State University 1229 Hawthorn Court Ames, IA 50010	11/93										x		
Gary Hoppes, Ind.Tech.Teacher Prairie High School 401 76th Ave. SW Cedar Rapids, IA 52404	11/93										x		
Gary McClanahan, Super, Career/Tech Ed Des Moines Public Schools 1800 Grand Avenue Des Moines, IA 50309	11/93										x		
John Casey, TP Instructor/Coord Iowa Valley CC District P.O. Box 536 Marshalltown, IA 50158	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Chuck Norby WITCC Box 265/4647 Stone Ave. Sioux City, IA 51102	11/93										x		
David Lagoo Northwest Iowa TP Consortium 603 W. Park Street Sheldon, IA 51201											x		
Dr. Jean Goodnow North Iowa Community College 500 College Drive Mason City, IA 50401											x	x	
Judy Thomas Federal TP Project, Iowa Lakes CC 3200 College Drive Emmetsburg, IA 50536											x	x	
Stan Friesen Ogden High School Box 250 Ogden, IA 50212											x	x	
Julie Stoik, TP Coord. Western Iowa Technical CC P.O. Box 265 Sioux City, IA 51102	6/94 (808) 823-0439										x	x	
Rich Ritland Pleasant Valley School Dist. POB 265 Pleasant Valley, IA 52767-0332	7/94 (319) 332-5151										x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2 + 2 TECH PREP PROGRAM

STATE: Idaho

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Wanda Light Idaho State University Pocatello, ID	11/92										x		
Marci Burstedt Region 5 Tech Prep Council School of Tech, Campus Box 8380 Pocatello, ID 83209-8380	5/93					(208) 236-4663 FAX (208) 236-4641						x	Math Review of CORD project
Wayne Rush State Division of Vocational Ed. 650 W. State Street Boise, ID 83720	11/93										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2 + 2 TECH PREP PROGRAM

STATE: Illinois

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Eric Cress Chicago, IL	8/92										x		
Nancy Davis Midstate College Peoria, IL	11/92										x		
Rebecca Douglass Sangamon State University Springfield, IL	10/92										x		
Debra Hunter Illinois Eastern Community College Olney, IL	7/91										x		
Sandi McBride Waubonsie Valley High School Aurora, IL	3/93										x		
Ruth Volz Patton Sangamon State University Springfield, IL	4/91										x		
Cathy Roberts McLean-DeWitt Reg. Voc. System Bloomington, IL	2/93										x		
Pam Bramlet Harrisburg High School 333 W. College Harrisburg, IL 62946	4/93										x		
Marilyn Probst Wood Dale School Dist. 7 543 N. Wood Dale Rd. Wood Dale, IL 60191	6/93										x	x	Course guides

BEST COPY AVAILABLE

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Linda Iliff University of Illinois 345 Ed. Bldg., 1310 S. 6th St. Champaign, IL 61820	6/93										x		
Leatha Ware (708) 691-7527 Debra Career Center 301 S. Swift Rd. Addison, IL 60101	6/93										x		
Tim Kulak West Aurora Schools 80 S. River Street Aurora, IL 60506	10/93										x		
Carmen Shelley DeSota High School Box 469, 8800 Penner Ave. DeSoto, KS 66018	11/93										x		
John Kilday, Director Vocational & Continuing Ed. 201 E. Jefferson Street Joliet, IL 60432	12/93										x		
Brenda Lack, Instructor Carmi-White County HS 800 West Main Carmi, IL 62821	11/93										x		
Debra Bragg, Instructor University of Illinois 344 Ed. Bldg., 1310 S. 6th Champaign, IL 61820	11/93										x		
Marc-Aurele Jeanty, Instructor Simeon Vocational HS 8235 S. Vincennes Chicago, IL 60620	11/93										x		
Bettye Richardson, TP CVS High School 2100 E. 87th Street Chicago, IL 60617	11/93										x		
Jim Oettel, Kein Adm. Decatur Public Schools 101 W. Cerro Gordo Decatur, IL 62523	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Carolyn Boiarsky, Instructor Illinois Central College One College Dr. - Th5 E. Peoria, IL 61635	11/93										x		
Jan Valuch, Instructor Homewood-Flossmore HS 999 Kadzie Avenue Flossmoor, IL 60422	11/93										x		
Jeffrey Flesher, Asst.Prof, Workforce Ed Southern Illinois University Navy Campus, Bldg. #2, NTC Great Lakes, IL 60088-5702	11/93										x		
Sue Beal, Instructor Southeastern Illinois College 3575 College Road Harrisburg, IL 62946	11/93										x		
Peter Tucker, Instructor Highland High School 12760 Troxler Avenue Highland, IL 62249	11/93										x		
Richard Glagousky, Administrator 315 Fox Run Road Libertyville, IL 60048	11/93										x		
Ralph Dirkson, Instructor Western Illinois University Industrial Tech Dept Macomb, IL 61455	11/93										x		
Donna Peterson, Instructor Kiswaubee College Malta Road Malta, IL 60150	11/93										x		
Marilyn Kovanda, Coord, VocEd Ridgewood High School 7500 W. Montrose Avenue Norridge, IL 60634	11/93										x		
Keith Robinson, Dist Chair, Indus/AppTec Main Township HS South 1111 South Dee Road ParkRidge, IL 60068	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Trudy Muller 3008 W. Willow Knoll Peoria, IL 61614	11/93										x		
Sharon Guilinger, Instructor Savanna Jr/Sr HS 500 Cragmoor Street Savanna, IL 61074	11/93										x		
Tom Voegtle, Jr., Editor Energy Concepts 7440 N. Long Avenue Skokie, IL 60077	11/93										x		
Gene Erickson, Instructor Steamwood HS 701 W. Schaumburg Road Streamwood, IL 60107	11/93										x		
Karen Paul 401 N. Larkin Avenue Joliet, IL 60435											x	x	
Charles Ellenbaum College of DuPage 22nd Street and Lambert Road Glen Ellyn, IL 60137-6599											x	x	
Curtis Miller Five County Regional Voc. System Second & Washington St., Box F Tamms, IL 62988											x	x	
Diane Smith Dawson Tech 3901 So. State Chicago, IL 60609											x	x	
Jack Rawlinson Southeastern IL Vocational System 112 N. 60th Harrisburg, IL 62946											x	x	
James Moore Prairie State College 202 S. Holsted Street Chicago Heights, IL 60411											x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
John Duffy Elgin Community College 192 Kathleen Drive Elgin, IL 60123											x		
Paul Heath Elgin Community College 1700 Spartan Drive Elgin, IL 60123											x	x	
Cathy Roberts Bloomington AVC POB 5187 Bloomington, IL 61702-5187	7/94 (309) 829-8671												

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Indiana

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Marylyn Rolle Vigo County School Corp. Terre Haute, IN	11/91										x		
Bruce Cunningham, Agri Dept Chair Franklin Community HS 625 Grizzly Cub Drive Franklin, IN 46131	11/93										x		
Margaree Johnson, Instructor Indianapolis Public Schools 120 E. Walnut, Room 504 Indianapolis, IN 46204	11/93										x		
Bryan Gause, Region IV VP NVATA POB 93 Liberty, IN 47353	11/93										x		
Jim Heller, Instructor Muncie Community Schools 2501 N. Oakwood Avenue Muncie, IN 47304	11/93										x		
Clarke Payne, Jr., Bldg.Trad.Instruc. Muncie Area Career Ctr. 2500 North Elgin Street Muncie, IN 47303	11/93										x		
JoBerta Hein, VocHomeEcon/FHA Advisor North Posey HS 5418 High School Road Poseyville, IN 47633	11/93										x		
Linda Schoeff Indiana Tech Ed Resource Center 140 N. Senate Room 208 Indianapolis, IN 46204											x	x	
Kathy Sherman Carroll High School 3701 Carroll Road Ft. Wayne, IN 46818											x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Sally Engle North Vermillion HS RR 1, Box 191 Cayuga, IN 47928	6/94 (317) 492-3364										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Kansas

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Laura Dodson S. Central Kansas TPAD Consortium Arkansas City, KS 67005	2/93										x		
Frank Veeman, VP/Instruction Allen County CC 1801 North Cottonwood Iola, KS 66749-1698	11/93										x		
Stan Abrahamson, Supervisor Area VocTec School 2220 North 59th Street Kansas City, KS 66104	11/93										x		
Jim Todd AVTS 2220 N. 59th Street Kansas City, KS 66104	11/93										x		
Mary Pitchford, Editorial Consultant Career Communications, Inc. 6701 W. 64th Street Overland Park, KS 66202	11/93										x		
Barry Dean, Representative PITSCO, Inc. 1004 E. Adams Pittsburg, KS 66762	11/93										x		
Patricia Soucy, Coord/Instructor Pittsburg Office Mgmt Center 813 N. Broadway Pittsburg, KS 66762	11/93										x		
David Little, President RMI Media Productions 2807 West 47th Street Shawnee Mission, KS 66205	11/93										x		
Marilyn Meyer, Dir. of VocEd Shawnee Mission Schools 6701 W. 83rd Street Shawnee Mission, KS 66204	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Monte Miller, Counselor KAW Area Technical School 6701 W. 83rd Street Shawnee Mission, KS 66204	11/93										x		
Larry Schrader, Program Ops Director Wichita Area Voc-Tech School 428 South Broadway Wichita, KS 67202	11/93										x		
Dr. Travis Kirkland Neosho County CC 1000 S. Allen Chanute, KS 66720											x	x	
Marie Branstetter Kansas City CC 7250 State Avenue Kansas City, KS 66112											x	x	
Susan Skoket West High School Wichita, KS 67213											x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Kentucky

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Peggy Arnold Boone County Board of Education 8330 U.S. 42 Florence, KY 40142	4/93										x		
Clayton Burgess, Principal Trigg County High School 203 E. Main Cadiz, KY 42211	11/93										x		
Betty Beardsley, Coord/VocEd Fayette County Public Schools 701 East Main Street Lexington, KY 40502	11/93										x		
Sue Breeze, Instructor Lafayette Senior High School Lexington, KY 40503	11/93										x		
Charlotte Tulloch, Spec.Voc.Ed. University of Kentucky 45 Dickey Hall, College of Ed. Lexington, KY 40506-0017	11/93										x		
William Davis, Instr., Tech Dept. Eastern Kentucky University 307 Fitzpatrick Richmond, KY 40475	11/93										x		
Pat Vencill, Instructor Madison Central High School 705 N. Second Street Richmond, KY 40475	11/93										x		
Sondra Chapman, Instructor Monroe County High School 755 Old Mulkey Road Tompkinsville, KY 42167	11/93										x		
Joe Light, Secondary Super. Warren County Public Schools 806 Kenton Street Bowling Green, KY 42101	5/94 (502) 781-5050										x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
C. R. Dassance Ashland Community College 1400 College Drive Ashland, KY 41101											x	x	
Judy Rhoads Queensboro CC New Hartford Road Queensboro, KY 42303											x		
Marie Piekalski U. KY CC Room 213, Breckenridge Hall Lexington, KY 40506											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Louisiana

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Carol Borskey Louisiana State DOE Baton Rouge, LA	6/92			x		MHCC, Centennial, David Douglas					x		
Gayle Flowers NW Louisiana Tech Prep Consortium Shreveport, LA 71106	9/92			x		MHCC					x	x	Life Situations Info.
Anthony Molina Delgado Community College New Orleans, LA	5/91										x		
Elaine White NW Louisiana TP Consortium Shreveport, LA	9/92			x		MHCC, Corbett, David Douglas, Barlow, Sandy					x		
Rusty Weaver, Bd. Member E. Baton Rouge School Board P.O. Box 2950 Baton Rouge, LA 70821	11/93										x		
Yvonne Normand, CHE 130 Crest View Drive Opelousas, LA 70570	11/93										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Massachusetts

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Ed Urbanowski Assabet Valley Voc. HS 215 Fitchburg St. (508)485-9430 x226 Marlborough, MA 01752 (508)755-1989	4/93	x									x		
Jean Michaels, Instructor Technical Vocational Ed. 75 New Dudley Street Boston, MA 02120	11/93										x		
J. Moscaritolo, Instructor Madison Park 75 New Dudley Street Boston, MA 02120	11/93										x		
Wilfrid Savoie, Superintendent-Dir Blue Hills Regional Tech School 800 Randolph St. Canton, MA 02021	11/93										x		
John Lind, Metal Fab Dept. Head Smith Vocational Agri. HS 80 Locust Street Northampton, MA 01060	11/93										x		
Allison Timperio, Acct. Executive CMG Information Services P.O. Box 7000 Wilmington, MA 01887-7000	11/93										x		
Janet Doe, Director Worcester Technical Inst. 251 Belmont Street Worcester, MA 01605	11/93										x		
Ed Terceiro Mt. Washusett CC Gardener, MA 01440											x	x	
Patricia Nobrega TP Consortium, Mt. Wachusett CC 444 Green Street Gardner, MA 01440											x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Rich Brennan Blackstone Valley Tech Pleasant Street Upton, MA 01568-1499	9/94 (505) 329-7758										x		
Richard Kazis Jobs for the Future 1815 Massachusetts Ave. Cambridge, MA 02140											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Maryland

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Dr. Mary Byrski Charles County Community College P.O. Box 910, Mitchell Road LaPlata, MD 20646	4/93			x		MHCC, David Douglas		1			x		
Priscilla Abney, VocEd Dept. Hd Francis M. Wood HS #178 100 N. Calhoun Street Baltimore, MD 21223	11/93										x		
Maria Blake 7543 Spring Lake Drive, C-2 Bethesda, MD 20817	11/93										x		
Emily Green, Instructor Suitland High School 5200 Silver Hill Road Forestville, MD 20747	11/93										x		
Ronald Hoyman, Sup., Tech Programs Baltimore County Public Schools 6901 Charles St. Towson, MD 21204	11/93										x		
Dr. D. L. Cornick Waldon University 9508 Deerfoot Way Columbia, MD 21046											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Maine

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Maurice Bernier, Instructor Maine Vocational Reg. 10 Church Road Brunswick, ME 04011	11/93										x		
Bruce Vermeulen, Sr. Program Officer T.D.C. 18 School Street Bucksport, ME 04416	11/93										x		
Dr. William Hierstein Central Main Technical College 1250 Turner Street Auburn, ME 04210-6498											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Michigan

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Malinda Bush 47643 Greenwich Novi, MI 48374												x	Hosp/Tour. packet
Gus Demas, Coll Prep for Employ Consort Macomb Community College, F-125 44575 Garfield Road Clinton Township, MI 48038-1139	1/94										x		
Naomi Singer, Coord, Special Pop/TP Charlevoix-Emmet Intermediate 08568 Mercer Blvd., POB 318 Charlevoix, MI 49720	11/93										x		
Carol Smith, Instructor T.B.A. Career Tech Center 880 Parsons Rd. Traverse City, MI 49684	11/93										x		
Ethel Washington 5057 Woodward Avenue Detroit, MI 48202	11/93										x		
Roger Gustafson, Instructor Delta-Schoolcraft I.S.D. 2525 3rd Avenue So. Escanada, MI 49829	11/93										x		
Alfred Summers Breithaupt Career Tech Center 9300 Hubbell Detroit, MI 48228											x	x	
Darrell Garth Oakland Community College 2900 Featherstone Rd. Auburn Hills, MI 48326											x	x	
Guy Altieri Washtenaw Community College 4800 East Huron River Drive Ann Arbor, MI 48106-0978											x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Joyce Haver Monroe County Community College 1555 S. Raisinville Road Monroe, MI 48161											x	x	
Karen Hoffman Washtenaw Community College 426 Packard Street #5 Ann Arbor, MI 48104											x	x	
Renn Corrigan Clare-Gladwin Intermediate Sch. Dist. 4041 East Mannsiding Road Clare, MI 48617											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Minnesota

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
James Arndt Duluth Technical College Duluth, MN	1/93			x		MHCC, Reynolds, David Douglas	15	1			x		
Joanne Collins Capitol View Center Little Canada, MN	1/92										x		
Sue Donar KVTC Fairfield, MN	7/91										x		
William C. Knaak, Coord. Consultant Northeast Metro Tech Prep Consortium 70 W. Co. Road B2 Little Canada, MN 55117-1402	3/93										x		
Joyce Weed 7182 185th Ave. Becker, MN 55308	5/93										x		
Ginny Pease, Dir. of Ed. Minnesota Business Partnerships, Inc. 4050 IDS Center Minneapolis, MN 55402	1/94										x		
Marv Ziner, Instructor Senior High 900 School Street ElkRiver, MN 55330	11/93										x		
Jean Jackson District 77 AHS 110 Fulton Manicato, MN 56001	11/93										x		
Kris Goehring, Editor Finney Company 3943 Meadowbrook Road Minneapolis, MN 55426-4505	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Suevonne Negaard, Voc. Director Tech Prep 14445 Diamond Path Rosemont, MN 55068	11/93										x		
Kerry Lindgren, FFA Advisor Staples HS Agricultural Ed. 3rd Street NE Staples, MN 56479	11/93										x		
Bruce Petterson Hutchinson High School 1200 Roberts Road Hutchinson, MN 55350											x	x	
Dr. Vicky Smith Austin Community College 1600 8th Ave., NW Austin, MN 55912											x		
Sally Jane Ihne Brainerd Community College College Drive Brainerd, MN 56401											x	x	
Vicky Smith Austin Community College 1600 8th Avenue NW Austin, MN 55912											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Missouri

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Clark Ferris Sedila, MO	7/92										x		
Ray Walsh, Director Mineral Area College Flat River, MO	3/92										x		
Dr. T. C. Claw, Training Adm. 3M Electronics Products Div. 5400 Route B, P.O. Box 1228 Columbia, MO 65205-1228	5/93					(314) 886-1235 FAX (314) 886-1459					x		
Rogene Nelson, Dept/Human Environ. Sci. Fontbonne College 6800 Wydown Blvd. St. Louis, MO 63105	8/93										x	x	all packet information
Jay Acock, Principal Cole R1 Schools 100 Park Street Russelville, MO 65074	1/94										x		
Bob Larivee, Dir., MO State Dept of Ed Special Needs/Guidance Services P.O. Box 480, 205 Jefferson St. Jefferson City, MO 65102	11/93										x		
Ted Berni, Principal South Technical High School 12721 W. Watson St. Louis, MO 63127	11/93										x		
Karen Smith, Promotions Coord. Dept. of Practical Arts University of Missouri Columbia, MO 65202	11/93										x		
Bruce Rose, Dir. of Adult Ed. Hannibal Area Voc-Tech School 4550 McMasters Avenue Hannibal, MO 63401	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Les Lang, Counseling/Placement Fort Osage Area Voc-Tech School 2101 N. Twyman Road Independence, MO 64058	11/93										x		
Lee Hampton, Voc Resource Ed. Dept. of Voc-Tech/Adult Ed. 301 E. Armour Blvd., Rm. 200 Kansas City, MO 64111	11/93										x		
Jane Merdic, Coord. Voc Ed. Kansas City School District 301 E. Armour Blvd., #200 Kansas City, MO 64111	11/93										x		
Marcia Northup LSHS 400 Blue Parkway Lee's Summit, MO 64063	11/93										x		
R. Youngs, Instructor Building Training Center 105 W. 12th Avenue North Kansas City, MO 64116	11/93										x		
Clark Harris, Dir. of Tech Prep State Fair CC 3201 West 16th Street Sedalia, MO 65301-2199k	11/93										x		
Barbara Voigt, Instructor Hillyard Tech 36th & Faraon St. Joseph, MO 64506	11/93										x		
Patrick Downey, COE-Coord. Mehlville School District 3200 Lemay Ferry Road St. Louis, MO 63125	11/93										x		
Carolyn Rybicki, Prof/Chair Home Ec St. Louis CC 3400 Pershall Road St. Louis, MO 63135-1499	11/93										x		
Curtis Netcott, Instructor 1800 Grand St. Louis, MO 63134	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Castella Henderson St. Louis Community College 300 S. Broadway St. Louis, MO 62101											x	x	
Dr. James Kellerman Missouri CC Association 325 Jefferson St., Suite 100A Jefferson City, MO 65101											x		
R. H. McCoin Caruthersville Secondary Education 1713 Ward Avenue Caruthersville, MO 63830											x	x	
Ronald Fundis, Pres. Jefferson College 1000 Viking Drive Hillsboro, MO 63050											x		
Wally McGinnis, TP Coord. North Central CC 1301 Main Trenton, MO 64683	8/94										x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Mississippi

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Jack Seale **SW Mississippi** Community College Summitt, MS	12/92										x		
Shirley Moore, Instructor Amory Vo-Tech POB 330 Armory, MS 38821	11/93										x		
Maudean Sanders, TP Coord. ECCC Box 129 Decatur, MS 39327	11/93										x		
Leanard Plitt 100 Perry Street Gulfport, MS 39507	11/93										x		
Bertha Williams, Asst. State Supervisor HE.EC POB 771 Jackson, MS 39205	11/93										x		
Ellen Shaw, Instructor East Mississippi CC P.O. Box 100 Mayheaur, MS 39753	11/93										x		
James Rushing, Counselor SMCC College Drive Summit, MS 39666	11/93										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Montana

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Donna Berkhof Great Falls Voc-Tec Center Great Falls, MT	5/92			x		MHCC, Consortium, high schools	5	1			x		
Perc Craddock Butte Public High School Butte, MT	11/92			x		MHCC, David Douglas	42	1			x		
Pat Kersher Great Falls Voc-Tech Center Great Falls, MT	2/91										x		
Cheri Jimeno Western Montana College Butte, MT	4/92				x				Miller	Western Montana College			Meeting Speaker
Lloyd Isola, Counselor Butte Voc. Tech Center 25 Basin Creek Rd. Butte, MT 59701	5/93			x		MHCC, high schools					x		
Lillian Klawitter 104 39th Missoula, MT 59803	11/93										x		
Bob Whalen Billings Career Center 3723 Central Avenue Billings, MT 59101	11/93										x		
Donna Berkhof Central Montana TP Consortium 2100 16th Ave. South Great Falls, MT 59405											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Montana

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Donna Berkhof Great Falls Voc-Tec Center Great Falls, MT	5/92			x		MHCC, Consortium, high schools	5	1			x		
Perc Craddock Butte Public High School Butte, MT	11/92			x		MHCC, David Douglas	42	1			x		
Pat Kersher Great Falls Voc-Tech Center Great Falls, MT	2/91										x		
Cheri Jimeno Western Montana College Butte, MT	4/92				x				Miller	Western Montana College			Meeting Speaker
Lloyd Isola, Counselor Butte Voc. Tech Center 25 Basin Creek Rd. Butte, MT 59701	5/93			x		MHCC, high schools					x		
Lillian Klawitter 104 39th Missoula, MT 59803	11/93										x		
Bob Whalen Billings Career Center 3723 Central Avenue Billings, MT 59101	11/93										x		
Donna Berkhof Central Montana TP Consortium 2100 16th Ave. South Great Falls, MT 59405											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: North Carolina

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Anne White Perquimans County Schools Hertford, NC	1/92										x		
Myrtle Stogner Richmond County Schools P.O. Box 1189 Hamlet, NC 28345	4-93		x	x		MHCC, David Douglas	1	1			x		
Roy Eubanks Duplin County Schools POB 128 Kenansville, NC 28349	11/93										x		
Johnny Hamilton, Manager Construction Trades Press P.O. Box 953 Clinton, NC 28328	11/93										x		
Terry Reece, Voc. Guidance Cabarrus County Schools P.O. Box 388 Concord, NC 28026	11/93										x		
Rosella Cox, Instructor Alamance County Schools 903 Trollinger Road Graham, NC 27253	11/93										x		
Dewey Adams, Prof., Coll.of Ed/Psych. North Carolina State University Box 7801 Raleigh, NC 27695-7801	11/93										x		
Shirley Dove NCSU 5316-B Wayne Street Raleigh, NC 27060											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: North Dakota

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
ElRoy Burkle Route 1, Box 227 Devils Lake, ND 58301	11/93										x		
LeRoy Boespflug, VocEd Dir. Dickinson Public Schools P.O. Box 1057 Dickinson, ND 58601	11/93										x		
Jacque Crehan, Instructor University NE - Lincoln 517 Nebraska Hall Lincoln, NE 68588-0515	11/93										x		
Carol Johnson, Dir, TP Program Nebraska Dept. of Ed. 301 Centennial Mall S, Box 94987 Lincoln, NE 68509-5987	11/93										x		
John Renzelman, Instructor Wayne State College Wayne, NE 68787	11/93										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Nebraska

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Janice C. Hess William J. Bryan Senior High Omaha, NE	4/92										x		
Richard Campbell, Director Tech Prep Ed., Neb. Dept. of Ed. 301 Centennial Mall S., POB 94987 Lincoln, NE 68509-04987	6/93					(402) 471-2295 FAX (402) 471-0117					x	x	English & Guidelines
Mary Jo Kulp, Coord., NVCRC University of Nebraska at Kearney West Center, W209 Kearney, NE 68849	1/94										x	All	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: New Hampshire

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Ann Weddleton, Grants Prgm. Coord. NH Technical Colleges 5 Institute Drive Concord, NH 03301-7400	11/93										x		
Langdon Plumer, Principal Seacost School of Technology 40 Linden Street Exeter, NY 03833	11/93										x		
Judith Hildebrandt, Coord. Learning Resources Center, #3201 Keen State College Keene, NH 03435-3201	11/93										x		
Armand Peters, Graphics Tech Nashua Senior High School 36 Riverside Drive Nashua, NH 03062	11/93										x		
Gary Eastman, Instructor Portsmouth High School Portsmouth, NH 03801	11/93										x		
Samuel Bruno, Vocational Dir. Somersworth HS Vocational Center 12 Memorial Drive Somersworth, NH 03878	11/93										x		
Ann Weddleton New Hampshire Tech. Colleges 5 Institute Drive Concord, NH 03301-7400											x	x	
Dr. Keith Bird New Hampshire Tech. Colleges 5 Institute Drive Concord, NH 03301-7400											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: New Jersey

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Dr. Blythe F. Hinitz College Preschool Liaison Trenton State College Trenton, NJ 08650-4700	4/93										x		
Carole Cummings U.S. Embassy, Santiago, Chili 334 Washington Ave. Avon, NJ 07717	11/93										x		
Bruce Dabney, Instructor Snyder High School 239 Bergen Avenue Jersey City, NJ 07305	11/93										x		
Ned Sheerin, President Resource Ed. Products 10 Westbrooke Ct. Voorhees, NJ 08043	11/93										x		
William Ollila, Super., Tech Voc Ed. Passaic Cty. Tech-Voc HS 45 Reinhardt Road Wayne, NJ 07470	11/93										x		
Dr. Marion Bonaparte Union County College 12-24 West Jersey St. Elizabeth, NJ 07207											x	x	
Gretchen Brown Essex County College 303 University Avenue Newark, NJ 07102											x	x	
Raymond Volpe Bergen County Technical Schools 200 Hackensack Avenue Hackensack, NJ 07601											x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: New Mexico

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Diane Garcia Santa Fe Community College Sante Fe, NM	6/91										x		
Spankie Bassett 1907 W. Sears Artesia, NM 88210	11/93										x		
Robert Dorak, Vice President Crownpoint Inst. of Tech. POB 849 Crownpoint, NM 87303	11/93										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Nevada

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Anne Keast Western Nevada Community College Carson City, NV	10/91			x		MHCC					x		
Harry Steiner Western Nevada Community College (702) 887-3152	1/93										x		
Will Hickman Truckee Meadows CC 7000 Dandini Blvd. Reno, NV 89512-3999	11/93										x		
John Jeans, Agric. Consultant Nevada Dept. of Ed. 400 W. King Street Carson City, NV 89710	11/93										x		
Juanita Kari Northern Nevada College 901 Elm Elko, NV 89801											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: New York

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Michael Broudo Manpower Demonstration Research Corp. New York, NY	4/92										x		
John Rivera Board of Cooperative Education Services West Nyack, NY	10/92										x		
Constance Spohn University at Albany Albany, NY	3/92										x		
Cynthia Wellins Fashion Institute of Technology 7th Avenue at 27th Street New York, NY 10001	4/93										x		
Patricia Franks, President NY State Occupational Ed. Assn. Broome CC Binghamton, NY 13902	11/93										x		
Terry Hughes, Agric. Eng. Tech. State University of New York College of Agri. & Tech. Cobleskill, NY 12043	11/93										x		
Rich Tarpinian, Instructor R.J.T. Educational Train. Sys. 78 New Hyde Park Road Franklin Square, NY 11010	11/93										x		
William Youngfert, President Herricks Middle School 258 Roosevelt Avenue Franklin Square, NY 11010	11/93										x		
Gerald Hill, Instructor B-2-7 Slocum Heights Syracuse, NY 13210	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Thomas Olivo, Exec. Director Industrial/Voc Training Consultants P.O. Box 532 West Sand Lake, NY 12196	11/93										x		
Debbie Hodges, Dist. Manager Celmar Publishers, Inc. P.O. Box 15015 Albany, NY 12212-5015	11/93										x		
David Mathis Mokawk Valley CC 1101 Sherman Drive Utica, NY 13501-5394											x		
Dr. Paul Mooradian University at Albany 135 Western Avenue Albany, NY 12222											x	x	
Paul Mooradian Two-Year College Dev. Ctr. 135 Western Avenue Albany, NY 12222											x	x	
Stephen Curtis BMCC 199 Chambers Street New York, NY 10007											x		
Beth Virginia Blau, E.D. Curriculum Coord, Nassauyy Tech Prep Valentine Road and Plain Road Westbury, NY 11590											x	x	

REQUESTS/INQUIRIES FOR INFORMATION
AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Washington

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Gerald Butts Seattle Public Schools Seattle, WA	1/93 4/93			x x		MHCC, local high schools	8 1	1 1			x		
Ellen Diagracourt University of Washington Seattle, WA	7/92										x	x	Video tapes, Manufacturing, Hospitality/ Tourism
Judy Fortune Walla Walla Community College Walla Walla, WA	11/92			x		MHCC, Centennial		1			x		
Larry Galli Everett High School Everett, WA	11/91											x	MHRCC Annual Report
Emil Rosenberg Institute for Extended Learning Colville, WA	11/91											x	HB 3565 & Video Tape
Susan Tinker Skagit Valley College Mount Vernon, WA	10/91			x		MHCC					x		
Washington Assn. of Occupational Ed. Conf. Yakima, WA	10/91								Miller	Conference	x		Conference speaker
Bob Wolfe Yakima Valley College Yakima, WA	11/91											x	HB 3565 & Video Tape
Mrs. Malver Haynes, Program Mgr. Voc-Tech Education/Tech Prep Coord. Seattle Public Schools 22nd Ave. South, Seattle, WA 98144	11/92										x		

BEST COPY AVAILABLE

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Dolores Booker, Hd. Counselor Seattle Pub. Schools 3013 S. Mt. Baker Blvd. Seattle, WA 98144	4/93			x		MHCC & Local High Schools					x		
Scott E. Phillips Grays Harbor College 1620 Edward P. Smith Dr. Aberdeen, WA 98520	5/93										x	x	All
Robert Behrendt Yakima Valley CC P.O. Box 1647 Yakima, WA 98907	5/93										x	x	English, Turf
Chris D. Strickwerda Highland CC P.O. Box 98000 Des Moines, WA 98198-9800	5/93										x	x	Articulation Agree.
Morry Foss Clover Park Tech. Coll. 4500 Steilacoom Blvd., SW Tacoma, WA 98499	7/93										x	x	Articulation Agree.
Molly Sullivan Columbia Basin Tech Prep 2600 N. 20th Avenue Pasco, WA 99301	1/94										x	All	
Linda Cowan, Dean of Instruction Whatcom CC 237 W. Kellogg Road Bellingham, WA 98226	11/93										x	All	
Marcia Henkle, Coordinator Tech Prep/Work Experience 1300 Fifth Street Wenatchee, WA 98801	11/93										x	All	
Bob Brown, WVATA Eastmont High School 955 NE 3rd St. East Wenatchee, WA 98802	11/93										x		
Jack Starr, Consultant Jack Starr & Associates 4106 N. 35th Street Tacoma, WA 98407-5521	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Phil Baus, Instructor Clark County Skills Center 12200 NE 28th Street Vancouver, WA 98682	11/93										x		
Bob Hunsiter Joel Ferris High School 3020 37th Avenue Spokane, WA 99223-4520											x	x	
Dr. Phil Tuller Yakima Valley CC South 16th Ave., POB 1647 Yakima, WA 98907-1647											x		
Kathi Hiyane-Brown Tacoma Community College 5900 S. 12th Street Tacoma, WA 98465											x		
Molly Sullivan Columbia Basin CC 2600 N. 20th Ave. Pasco, WA 99301	5/94			x		MHCC and high schools					x	x	
Paul Parnell- Skagit Valley College 2405 E. College Way Mt. Vernon, WA 98273	5/94			x		MHCC and high schools					x	x	
Traci Mordell CMI, Inc. 101 Stewart St., Suite 910 Seattle, WA 98101											x	x	
Paul Parnell Skagit Valley College 2405 E. College Way Mt. Vernon, WA 98273	10/94										x	x	English Div. materials
Linda Cowan, Director Whatcom County TP Consortium 237 W. Kellogg Road Bellingham, WA 98226	10/94										x	x	
Clark Community College 20440 Fort Street Vancouver, WA 98102	10/94										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

STATE: Wisconsin

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Mary Skalecki East High School	1/93			x		MHCC		1			x		
William Barribeau, Instructor Fox Valley Tech. College 1825 N. Bluemound Dr. POB 2277 Appleton, WI 54913-2277	11/93										x		
Bill Ratzburg, Instructor Kenosha Unified School Dist. 3600 52nd Street Kenosha, WI 53144	11/93										x		
Michael Tokheim, Ed. Consult. Bus/Tech Prep 310 Price Place, POB 7874 Madison, WI 53707-7874	11/93										x		
Michael Galloy, Assoc. Prof/Dir University of Wisconsin 224D Communicationi Menomonie, WI 54751-0790	11/93										x		
Kandee Rosburg 2600 Catlin Superior, WI 54880	11/93										x		
Dr. Daniel Burrell Milwaukee Area Technical College 700 West State Street Milwaukiee, WI 53233-1443											x	x	
Edward Falck Lakeshore Technical College 1290 North Avenue Cleveland, WI 53015-1414											x	x	
Mary Lou Santovec Magna Publications 2718 Dryden Dr. Madison, WI 53704											x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Dr. Linda Stewart State Technical College System Board 310 Price Place, POB 7874 Madison, WI 53707											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: West Virginia

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
John Cole United Technical Center Routef 3, Box 43-C Clarksburg, WV 26301	12/93										x	All	
Karl Hunsmann Summers & Virginia Streets Charleston, WV 25301	11/93										x		
John Cole United Technical Center Clarksburg, WV 26301	11/93										x		
Pam Stewart, Instructor John Marshall HS 1300 Wheeling Ave. Glendale, WV 26038	11/93										x		
Sue Smith, Manager The Training Place 1703 Smith Rd. Charleston, WV 25314						(304) 344-1347					x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Wyoming

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Frank Prevedel, Sweet Water Boces Bd. of Coop Ed. Services POB 428 Rock Springs, WY	10/93			x		MHCC and Centennial	5	1			x	All	
Gary McDowell, Instructor Central High School 5500 Education Drive Cheyenne, WY 82001	11/93										x		
Roberta Schiemek, Instructor Rock River School POB 128 Rock River, WY 82083	11/93										x		
Ron Moss Gillette Campus 720 West 8th St. Gillette, WY 82716											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS

For

2+2 TECH PREP PROGRAM

OTHER

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Joel E. Miles College of Micronesia Koror, Republic of Palau	8/92										x		
Delegation of Yugoslavian Business People	10/91			x		MHCC		1			x		
Emma Reid, Policy Analyst U-Bix Centre PH:(04)385-0459 79 Taranaki Street, P.O. Box 160 Wellington, New Zealand	3/93										x		
Dorothy Bennett, Coordinator Hawthorn Campus, U of Technology P.O. Box 218 FAX 613 8183649 Victoria 3122, Australia +613 8198149	3/93			x		Consortium meeting					x		
Ann Torline, Hospitality Resources 2-3 Susannaberg St. Johns, U.S. Virgin Islands 00830 (809) 776-7673	6/93										x	x	All
Robert Blissmer, College of Micronesia P.O. Box 159 Kolonia Pohnpei, Federated States of Micronesia 96941	7/93										x	x	All
Manuel Cruz, Exec. Director Guam State Council on Voc. Ed. P.O. Box 2950 Agana, Guam 96910 U.S.A.	11/93										x		
Susan Crawford Process for Design 216-131 Water Street Vancouver, British Columbia V6B4M3	11/93										x		
Margaret Lucas, Hagley CC Te Puna Wai O Waipapa 510 Hagley Ave., POB 3084 Christchurch, New Zealand	9/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Teruo Rengulbai Ministry of Education P.O. Box 189 Koror, Palau 96940	11/93										x		
Yegin Habteyes Box 5221 St. Thomas, USVI 00803	11/93										x		
Alaine Powell 7594 Lower Hall St. Thomas, VI 00801	11/93										x		
Nick Parkis, Representative City & Guilds of London Institute 46 Brittania Street London, WCIX 9RG, United Kingdom	11/93										x		
Lynne Eagle, Dept. Hd., Mgmt/Mktg. Manukau Polytechnic POB 61-066 Otara, Manukau, New Zealand	10/93										x		
Francis Matsutaro Palau Community College PW 96940 Republic of Palau											x	x	
David Hood U-Bix Center 79 Taranaki St. Wellington, New Zealand	4/94			x		MHCC and high schools					x	x	
Margaret Lucas Hagley CC P.O. Box 3084 Christchurch, New Zealand	6/94			x		MHCC and high schools					x	x	
David Lythe New Zealand QA, U-Bix Center 79 Taranaki St., POB 160 Wellington, New Zealand	4/94			x		MHCC and high schools					x	x	
Marlene Nicholas Adelaide Institute 20 Light Square, POB 1872 Adelaide 5001, Australia (South)	4/94			x		MHCC and high schools					x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Don Snow Red Deer College Box 5005 Red Deer, Alberta, Canada T4N5H5	5/94			x		MHCC and high schools					x	x	
David Lythe New Zealand QA, U-Bix Center 79 Taranaki St., POB 160 Wellington, New Zealand	8/94			x		MHCC and high schools					x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Ohio

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Steve Chambers ERIC/ACVE Columbus, OH	2/93										x		
Bob Norton Ohio State University Columbus, OH	1/93										x		
Judie Taylor Washington State Community College Marietta, OH	8/92										x		
Brad Briggs, Tech. Coordinator Eastland Vocational School Dist. 4000 Columbus-Lancaster Rd. Carroll, OH 43112	11/93										x		
Dale Yoder, Trade/Indus. Supervisor Northwest Local School Dist. 8801 Cheviot Road Cincinnati, OH 45251	11/93										x		
Karen Hale, Indus. Training Coord. Mayfield High School 6116 Wilson Mills Rd. Cleveland, OH 44143	11/93										x		
Morgan Lewis, Research Sci., Coll.ofEd Ohio State University 1900 Kenny road Columbus, OH 43210	11/93										x		
Larse Watkins 5390 Tartan Lane Columbus, OH 43235	11/93										x		
Bonnie Short, Instructor Rutherford B. Hayes HS 289 Euclid Avenue Delaware, OH 43015	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Timothy Barrett, Natl. Sales Mgr. Frey Scientific 223 South Illinois Ave., Dept AA Mansfield, OH 44905	11/93										x		
John Harkness, VP, Marketing FSC Educational, Inc. 905 Hickory Lane Mansfield, OH 44905	11/93										x		
John Skulski, Applied Academics Spec. Frey Scientific 223 South Illinois Ave., Dept. AA Mansfield, OH 44905	11/93										x		
Robert Freeze Springfield Clark JVS 1901 Selma Rd. Springfield, OH 45504	11/93										x		
Merritt Obreiter, Instructor University of Toledo Toledo, OH 43606	11/93										x		
Carole O'Keefe Glencoe/Macmillan/McGraw-Hill 936 Eastwind Drive Westerville, OH 43081											x	x	
Carolyn Prager Franklin University 201 South Grant Avenue Columbus, OH 43215-5399											x	x	
David Ponitz Sinclair Community College 444 West Third Street Dayton, OH 45402											x		
Dr. Edward Florak Jefferson Technical College 4000 Sunset Blvd. Steubenville, OH 43952											x		
Paul Shumaker Cuyahoga Community College 2415 Woodland Avenue Cleveland, OH 44115											x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Dr. Barbara Bardes Raymond Walters Col., U of Cincin. 9555 Plainfield Road Cincinnati, OH 45236											x	x	
Lynn Willett, President Muskingum Area Technical College 1555 Neward Road Zanesville, OH 43701	7/94 (614) 454-2501										x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Oklahoma

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Carla High Francis Tuttle Voc Tech Center 12777 North Rockwell Oklahoma City, OK 73142	4/93			x		MHCC, David Douglas	3	1			x		
Kenneth Davies, Instructor 1201 W. Willow Enid, OK 73701	11/93										x		
Dunn Faires, Professor Technology Division Northeastern State University Tahlequah, OK 74464-2399	11/93										x		
Dr. James Lovell NE Oklahoma A&M College 200 I Street NE Miami, OK 74354-6497											x	x	
Terri Britton Rose State College 6420 SE 15th St. Midwest City, OK 73110											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Oregon

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Judith Gabriel Lane Community College Eugene, OR	1/93										x		
Cam Preus-Braly Workforce Quality Council Salem, OR	2/93											x	1992 Annual Report
Linda Quackenbush Columbia Gorge Community College The Dalles, OR	1/92										x		
Work Now and In The Future Conference Portland, OR	11/91			x					Miller	WNIF Conference			Conference Speaker
Linda O'Bryan Clatsop CC 1653 Jerome Astoria, OR 97103	5/93										x	x	Artic. agree
Sue Shields, Staff Dev. Coord. Tech Prep Committee Facilition No. Clark School Dist. 12 4444 Lake Rd., Milwaukie 97222-4799	6/93					(503) 653-3612					x	x	All
Marcia Douglas Portland Development Commission 1120 SW 5th, Suite 1100 Portland, OR 97204	7/93										x		
Sherrill Wells Umpqua CC POB 967 Roseburg, OR 97470	11/93										x		
Nancy Hargis, Coord, St. TP Program Oregon Dept. of Ed. 700 Pringle Parkway, SE Salem, OR 97310	10/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Ernie Keller, Dir., Prof-Tech Ed. Wasco Education Service District 422 East 3rd St. The Dalles, OR 97058	12/93										x	x	25 copies Benchmarks/ Milestones
Marvin Clemons, Regional Coord. Lane ESD P.O. Box 2680 Eugene, OR 97402	11/93										x		
Dan Forbess Douglas ESD 1871 NE Stephens St. Roseburg, OR 97470-1493											x	x	
Ellen Levine Chemeketa Community College POB 14007 Salem, OR 97302											x		
Ronald Daugherty Oregon State University Education Hall, Suite 220 Corvallis, OR 97331-3502											x	x	
Jack Rich McNary High School 505 Sandy Drive, N. Keizer, OR 97303	5/94 (503) 399-3233										x	x	
Dave Hall, Instructor Business & Technology 2038 SE Oak Crest Drive Hillsboro, OR 97123	7/94										x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Pennsylvania

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Rod Tolley Lancaster, PA	5/92										x		
Frank Vari, Chair, Staff Dev. Com. Tech Prep-Northampton CC 3835 Green Pond Road Bethlehem, PA 18017-7599	9/93										x	All	
Stephen Seu Eastern Montgomery Co. AVTS 3075 Terwood Road Willow Grove, PA 19090	12/93										x	All	
Anthony Crimaldi, Director Erie County Technical School 8500 Oliver Road Erie, PA 16509-4699	11/93										x		
James Sipple, Asst. Director Harrisburg Steelton-Highspire AVTS 2915 N. Third St., POB 5100 Harrisburg, PA 17110-0999	11/93										x		
Anthony Vicic, Admin. Director Cumberland Perry Voc-Tech School 110 Old Willow Mill Road Mechanicsburg, PA 17055	11/93										x		
Vicki Lantz 45 Mount Rock Road Newville, PA 17241	11/93										x		
Camille Bagnato Cambria County Area CC 727 Goucher St. Johnstown, PA 15905											x	x	
Frank Vari TP - Northampton CC 3835 Green Pond Road Bethlehem, PA 18017-7599											x	x	

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
John Gruff Allegheny Campus (CCAC) 808 Ridge Avenue Pittsburth, PA 15212											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Rhode Island

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Judy Marmaras Community College of Rhode Island 400 East Avenue Warwick, RI 02886	4/93			x		MHCC, David Douglas	2	1			x		
Eva Kent 2+2 Rogers High School Wickham Road Newport, RI 02840	1/94										x	All	
Wendy Smythe, Program Planner Palm Beach Tech Prep Consortium 4200 Congress Ave. (MS 54) Lake Worth, RI 03461	1/94										x	All	
Coleen Rapasa, Med. Tech Health Newport Area Vocational Tech Wickham Road Newport, RI 02840	11/93										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: South Carolina

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Diana Walter Tri-County Technical College P.O. Box 587 Pendleton, SC 29670	10/92 4/93			x		MHCC, David Douglas	3	1			x	x	English
Ted McClure State Board for Tech. & Comp. Ed. Columbia, SC	6/91										x		
Sandy Sarvis Lexington School District Swansea, SC	3/93											x	Hospitality/ Tourism
Emily Richardson State Department of Education Columbia, SC	5/91										x		
E. Baz Smith, Coordinator Catawaba Tech Ed. Consortium 2399 West Main St. Rock Hill, SC 29732	1/94										x	All	
Joan Anderson, Coord. App Tech/Car Dev Charleston County School District 3 Chisolm Street Charleston, SC 29401	11/93										x		
Allen Powell, Exec. Dir/Co-Founder Natl Voc-Tech Honor Society POB 200 Gramling, SC 29348	11/93										x		
Doris Small, Health Occ. Instructor Beaufort-Jasper Career Ed. Ctr. Rt. 1, Box 127 Ridgeland, SC 29936	11/93										x		
Sheila Harvin ACAP Consortium P.O. Box 8008 Sumter, SC 29150	4/94 (803) 469-6900										x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: South Dakota

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Judith Zikmund South Dakota Curriculum Center Pierre, SD	8/92										x		
Kathy Zubke NE South Dakota Consortium Watertown, SD	1/93										x	x	Articulation agreements
Kimberly Klostergard, Guid. Counsel. Central High School P.O. Box 4203 Aberdeen, SD 57402-4203	8/93										x	All	
Kathy Kay, Instructor Gregory High School Box 438 Gregory, SD 57533	11/93										x		
Beverly Rieck, Instructor Kimball High School Box 479 Kimball, SD 57355	11/93										x		
Armand Sequin, Dir. Voc-Tech Teach. Ed. Dakota State University 210 East Hall Madison, SD 57042-1799	11/93										x		
Larry Nelson, Asst. State Director Voc-Tech Education 700 Governors Drive Pierre, SD 57501-2293	11/93										x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Tennessee

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Jill T. Greene Doctoral Candidate University of Tennessee Knoxbille, TN	2/92										x		
Dr. Bill Halbert The Halbert Company Brentwood, TN	2/93										x		Hospitality/ Tourism
Susan Tinnon NE State Tech Community College Bloutville, TN	1/92										x		
Warren Groff 1531 Peabody Avenue Memphis, TN 38104	7/93										x	x	all packet information
Paulette Paredes Ridgewood High School 7500 W. Montrose Noro, TN 60634	12/93										x	All	
Rosemary Ragan, Home Economist School 225 Cedarview Drive Antioch, TN 37013	11/93										x		
J. Higdon, Instructor Bolton High School 7323 Brunswick Road Arlington, TN 38002	11/93										x		
Carol Smith Huntsville ISD 441 Fm. 2821 Huntsville, TN 77340	11/93										x		
Marie Freeman, Voc. Supervisor Knox Cty. Dept. Public Inst. P.O. Box 2188 Knoxville, TN 37901	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Camille King, Instructor Kirby High School 4080 Kirby Parkway Memphis, TN 38115-6535	11/93										x		
Martha Burton, Instructor Pearl Cohn High School 904 26th Avenue North Nashville, TN 37208	11/93										x		
Charles Davis, Instructor Motlow State Community College P.O. Box 88100 Tullahoma, TN 37388	11/93										x		
Dr. Charles Hurley Northeast State Tech. CC 2425 Highway 75, POB 246 Blountville, TN 37617-0246											x	x	
Fred Margin Pellissippi State Tech CC 10915 Hardin Valley, POB 22990 Knoxville, TN 37933-0990											x		
Suzanne Field Shelby State CC 737 Union Ave., POB 40568 Memphis, TN 38174-0568											x	x	
Terry Tolleson E. Tenn. State University Box 70550 Johnson City, TN 37614											x	x	

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Texas

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Lynn Carter Wichita Falls Public Schools Wichita Falls, TX	8/92										x		
Anne Farrell CORD Waco, TX	11/92										x		
Dr. Maurice Dutton, Project Director CORD P.O. Box 21689 Waco, TX 76702-1689	4/93			x		MHCC	1	1			x		
Barbara Huffman/Margaret Lindsey Austin Independent School District Austin, TX	5/92			x		MHCC, Reynolds, David Douglas		1			x		
Dr. Joan Jernigan Education Service Center 5701 Springdale Road Austin, TX 78723	2/93 4/93				x				Miller	Consulting	x		Consulting visit
R. Brent Kesterson Richland College Dallas, TX	10/92										x		
Laura Lesperance CORD Waco, TX	8/91										x		
Omar Rivera Graduate Student Mission, TX	1/92										x		
Steve Sadler CORD Waco, TX	2/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Marvin Wittrock San Jacinto College South Houston, TX	7/92										x		
National Tech Prep Network Inaugural Conference Dallas, TX	3/92								Miller /Dixon	Conference in Dallas			Conference Speakers
Julia Vitale P.O. Box 684055 Austin, TX 78768 (512)499-1701 x3703	5/93										x		
Tijiani Mohammed, Dept. of EHRDT 615 Harrington Ed. Center Texas A & M U. College Station, TX 77843-3256	6/93										x		
Dr. Gary R. Fuller, Director Technical-Vocational Ed. San Jacinto College South 13735 Beamer Rd., Houston, TX 77089	7/93										x	x	All
Lenora Crowder 3600 Auston Avenue Waco, TX 76710	8/93										x		
Barry Russell Central Texas Tech Prep 2600 S. First Street Temple, TX 76504	9/93										x		
Sylvia Kelly, TP Director Collin CC 2200 W. University McKinny, TX	10/93										x	All	
Martin Strand, Dir. Voc. Ed. Alvin Independent Sch. Dist. 1010 South Johnson Alvin, TX 77511-3568	11/93										x		
E.A. Boggan, Teacher-Educator ETSU-Commerce 3404 Ambassader Row Arlington, TX 76013	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Kelly Gourley, Mkting Ed. Coord. Conroe Independent School Dist. 1717 Wilson Road Conroe, TX 77304	11/93										x		
Lee Sloan, Dir. Coastal Bend TP Consort Del Mar College 101 Baldwin Corpus Christi, TX 78404	11/93										x		
Glynda Wright-Davis Instructor 1901 Libby Lane Grand Prairie, TX 75050	11/93										x		
John Brown, Assoc. V-Chancellor Tech Ed Houston CC System 2720 Leeland Houston, TX 77003-5394	11/93										x		
Rosalynd Cravin One Raider Circle Houston, TX 77080	11/93										x		
Judy Christopher 901 O'Connor Irving, TX 75061	11/93										x		
Jerry Knight, Dir. Career/Tech Ed. Mansfield ISD 605 E. Broad Street Mansfield, TX 76063	11/93										x		
Carolyn Madewell, Instructor Mansfield High School 1520 Walnut Creek Drive Mansfield, TX 76063	11/93										x		
Wayne Vanderpool, Asst. Principal South Texas School Dis. 700 Med High Drive Mercedes, TX 78570	11/93										x		
Jackie Veach, Mkt. Teach-Coord. Montgomery High School P.O. Box 1475 Montgomery, TX 77356	11/93										x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Linda Kelly, Voc. Supervisor Round Rock School District 1311 Round Rock Avenue Round Rock, TX 78681	11/93										x		
Hector Tello Suite 400 San Antonio, TX 78215	11/93										x		
Diane Malek, Instructor San Marcos High School 1301 State Hwy 123 San Marcos, TX 78666	11/93										x		
Ward McCain, Director Sequin Independent School Dist. 815 Lamar Street Sequin, TX 78155	11/93										x		
Doris Sharp, Director Texas University at Tyler 3900 University Blvd. Tyler, TX 75799	11/93										x		
Dr. Sanford Shugart North Harris CC 2700 W.W. Thorne Drive Houston, TX 77073											x	x	
Dr. Ed Lehr San Jacinto College North 5800 Uvalde Road Houston, TX 77049											x		
Edmonson, President Panola College 1109 W. Panola Carthage, TX 75633											x	x	
Elaine Adams HCCS Northeast College 401 Northline Mall Houston, TX 77022											x		
Linda Timmerman Navarro College 3200 W. 7th Avenue Corsicana, TX 75110											x		

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Linda Rodriguez St. Philip's College 800 Quintana Road San Antonio, TX 78211-1199											x	x	
Paula Mitchell Rio Grande Campus El Paso Community College El Paso, TX 79998											x		
Raquel Henry Kingwood College 20000 Kingwood Drive Kingwood, TX 77339											x	x	
Wendell Neal Houston CC 5514 Clara Road Houston, TX 77041											x	x	
William Law, Jr. Montgomery College 2018 IH-45 North Conroe, TX 77301											x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS For 2+2 TECH PREP PROGRAM

STATE: Utah

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Clayne Poulsen Murray City Schools Murray, UT	12/92										x		
DeVern Gerber, Cache Cty Sch Dist Cedar Ridge Middle School 65 North 200 West Hyde Park, UT 84318	11/93										x		
Gary Wixom, Vocational Director Utah Valley State College 800 West 1200 South Orem, UT 84056-5999	11/93										x		
Paul Smith, App. Tech Coord. Salt Lake City School Dist. 840 S. 1300 East Salt Lake City, UT 84102	11/93										x		
George Miller, TP Coord. Unitah Basin Applied Tech Ed. 1680 W. Highway 40, Suite 115B Vernal, UT 84078	11/93										x		
Craig Smith Weber State University Continuing Ed, Room 404 Ogden, UT 84408-4012											x	x	
Dr. Ann Erickson Salt Lake CC 4600 South Redwood Road Salt Lake City, UT 84130-0808											x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Virginia

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
James Hoerner Virginia Polytechnic Institute/State U. Blacksburg, VA	7/91										x		
Charles Sieracki Germanna Community College Locust Grove, VA	6/91										x		
Corine Miran, MSI 214 N. Jefferson St., Suite 600 Richmond, VA 23220	7/93										x	x	All
Jim Wehrley, Research Asst. Virginia Tech 112 Lane Hall Blacksburg, VA 24061-0254	7/93										x	x	All
John Lambert Associates 1010 Dominion Bank Building 213 S. Jefferson Roanoke, VA 24011	8/93										x	x	videotape
Regina Poniatowski Virginia Beach City Pub. Schools P.O. Box 6038 Virginia Beach, VA 23456-6038	12/93										x	All	
Nevin Frantz, Div. of Voc-Tech Ed. Virginia Tech Inst/Univ. 315 Lane Hall Blacksburg, VA 24061-0254	11/93										x		
Jacobeth Thabede, Instructor 750 Tall Oaks Drive, 3200-F Blacksburg, VA 24060	11/93										x		
Jillayne Lee 2301 Dunbarton Road Chesapeake, VA 23325	11/93										x		

BEST COPY AVAILABLE

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Barbara Blackwell, Instructor Hampton High School 1491 W. Queen Street Hampton, VA 23669	11/93										x		
Tom Hughes ITEA - FTE 608 Thrasher Way Mechanicsville, VA 23111-4455	11/93										x		
Clarice Moody, Instructor Menchville High School 275 Menchville H.S. Newport News, VA 23607	11/93										x		
Rosanne White, Exec. Dir. Technology Student Assn. 1914 Association Drive Reston, VA 22091	11/93										x		
Cathy Lemmon Community College Week 10520 Warwick Ave., Suite B-8 Fairfax, VA 22030											x	x	
Dorothy Schrag CAPER P.O. Box 85622 Richmond, VA 23285-5622	5-12, 13/94			x		MHCC and high schools					x	x	
Dr. Rob Goralewicz D. AL Community College POB 1000 Clifton Forge, VA 24422											x		

REQUESTS/INQUIRIES FOR INFORMATION AND SITE VISITATIONS
For
2+2 TECH PREP PROGRAM

STATE: Vermont

Page 1

REQUESTING GROUP'S NAME AND ADDRESS	CONTACT DATES	CONTACT METHOD		VISIT TYPE		ONSITE VISITATIONS		ON/OFF VISITS	OFFSITE VISITATIONS		MATERIAL SENT		*COMMENTS
		Ph.	Mail	On Site	Off Site	Site Visited	No. of Visitors	No. of Days	MHCC Rep.	Site(s) Visited	Pack.	Other	
Dr. Colin Ducolon Champlain College Burlington, VT	11/91										x		
Phil Rogers Lamoille Area Vocational School Cambridge, VT	4/92										x		
Kevin Christie, TP Coord. Auto Technology Hartford Voc. Center WRJ, VT 05001	11/93										x		

Appendix F

BENCHMARKS & MILESTONES

1993 Annual Report of the

Mt. Hood Regional Cooperative Consortium

Mt. Hood Regional Cooperative Consortium

BENCHMARKS & MILESTONES

A Statistical Summary of Regional

Tech Prep Activities

1994 Annual Report

TABLE OF CONTENTS

PAGE

INTRODUCTION 1

PARTICIPATING SCHOOL DISTRICTS and MEMBERS 2

CAREER PATHWAYS FOR CAM PROGRAMS 3

TECH PREP ARTICULATION AGREEMENTS 4

NUMBER OF STUDENTS TRANSCRIPTING CREDIT BY 2+2 TECH PREP PROGRAM 6

NUMBER OF STUDENTS TRANSCRIPTION 2+2 CREDIT BY HIGH SCHOOL 7

NUMBER OF V.I.P. CHOICE STUDENT APPLICATIONS BY COURSE 8

2+2 TECH PREP STUDENT TRANSCRIPTING BY PROGRAM 9

PROFESSIONAL-TECHNICAL INTER-DISTRICT PROGRAM APPLICATIONS 10

MARKET SHARE PERCENT OF MATRICULATING FALL HIGH SCHOOL GRADUATES 11

STUDENT PARTICIPATION CREDIT TRANSCRIPTION 12

VISIONS OF THE FUTURE 14

PROGRAM OF WORK 15

INTRODUCTION

Now in its tenth year of operation, the Mt. Hood Regional Cooperative Consortium continues to maintain and further expand its strong, effective cooperative relationship involving faculty members, administrators, board members, and support staff in its District high schools, the Multnomah Education Service District, and Mt. Hood Community College (MHCC). To date, 78 written articulation agreements have been established between MHCC and the eight high schools: Centennial, Corbett, David Douglas, Gresham, Parkrose, Reynolds, Sam Barlow, and Sandy. These agreements cover 17 different professional-technical areas of the college and all six of the high school Certificate of Advanced Mastery (CAM) areas.

Except during the summer, the Consortium meets monthly to plan, coordinate, and implement professional-technical education opportunities for students in the District. So successful have these efforts been, that a VIP program has been established that enables students at one District high school to take a course or courses at another District's high school when such courses are offered at a host high school but not at the students' resident high schools. To date, a total of 955 students have participated in this program at no additional cost either to the student, the parent, or the schools involved. This represents an estimated savings of $72,840 to students, parents, and taxpayers.

In their efforts to meet the requirements of Oregon House Bill 3565 by the year 2000, Consortium member schools have been deeply involved in education reform. The "SCANS Report" and the curriculum revisions prescribed for meeting National Council of Teachers of Mathematics (NCTM) standards in mathematics have provided further momentum for implementing change. To supplement curriculum materials and course content, local businesses and industries, such as Boeing of Portland, Fujitsu, and Fred Meyer Corporation, frequently send representatives to Consortium meetings to provide "real world" input to education reform activities. In addition, two strong leaders in mathematics and English curriculum reform--Pamela Matthews and Elaine Johnson, respectively--continue to provide hands-on workshops and training as well as assistance in writing curriculum and developing materials. A result of these efforts is an integrated, single-track, problem-solving mathematics program at MHCC and participating District high schools, as well as a new ninth grade applied communications course that was pilot-tested at three District high schools this past year.

Mt. Hood Community College completed its National Dissemination Grant activities as of December 31, 1994, as a National Tech Prep Demonstration Center, one of only nine in the nation. Operating with a $307,920 grant over a two-year period, MHCC worked with Consortium members to provide materials and visitations to out-of-area teachers and administrators. As of December 31, 1994, the Center had hosted 52 groups and disseminated materials to almost 3,000 requesting sites across the nation and to seven foreign countries. Members of the Consortium have also presented at many different national, regional, state, and local conferences.

In response to the Mt. Hood Tech Prep National Review Panel, the Consortium has broken out the Tech Prep areas into six career pathways for the Certificate of Advanced Mastery (CAM), as recommended by the Oregon Department of Education and described on page 3 of this report. According to these recommendations, all students in the state of Oregon must have access to at least one or more programs in each CAM. To earn a Certificate of Advanced Mastery, students must meet high performance outcome standards that emphasize the application of knowledge and skills in varied, realistic environments. In addition, the Oregon goal is to provide some work experience in a business or industry to all students prior to their graduating from high school.

PARTICIPATING SCHOOL DISTRICTS and MEMBERS

The following school districts and other organizations are responsible for the continuing success of the Mt. Hood Regional Cooperative Consortium

Chief Executive Officers	School Districts	Consortium Members
Mark Sherman, Principal	Alpha School	Wally Cole, Employer Liaison
Dr. Zeno Katterle, Superintendent	Barlow/Gresham	Rich Dills, Instructor Keith Eisele, Business Sherrie Scheinman, Counselor Bobbi Thomas, Coodinator, School/Business Partnership Kay Weaver, Director, Grade Schools
Dr. George Benson, Superintendent	Centennial	Joanne Bishop, Associate Principal Dr. Marvin Hempel, Director of Instruction Deanna Sawtelle, Pro-Tech Chair
Larry McClellan, Superintendent	Corbett	Roger Swenson, Instructor
Dr Anthony Palermini, Superintendent	David Douglas	Dr. Jim Dixon, Assocociate Principal Kathy Lillis, Vocational Coordinator Jim Schoelkopf, Technology Director
Dr Jim Jacobson, Superintendent	Multnomah ESD	Dr. Vernon Halcromb, Regional Coordinator Barbara Jorgensen, Director/Instruction Dr. Jerry Shiveley, Deputy Superintendent
Dr Paul Kreider, President	Mt. Hood Community College	Dr. Gil Albello, Science Division Debbie Derr, Counseling Michael Dillon, The Center Michael Durrer, Engineering Division Dr. Elaine Johnson, Communications Division Karen Knight, Grants Development Pamela Matthews, Mathematics Division Dr. Jack Miller, Professional Technical Development Ted Scheinman, Economics Dr. Gretchen Schuette, Vice President Dave Shields, Career Placement Kathleen Waldron, Counseling
Dr. John Bierwirth, Superintendent	Portland	Roger Schoenborn, Occupational Specialist
Dr. Jacki Cottingim, Superintendent	Parkrose	Barbara Ritt, Assistant Principal
Dr. Hudson Lasher, Superintendent	Reynolds	Dave Barger, Career/Curriculum Specialist Jim Rogers, Assistant Principal
Dr. Dennis Crow, Superintendent	Sandy Union	Len Eaton, Business Tech Director Linda Grant-Barger, Career/Curriculum Specialist

Community Representatives

Janet Adrian, Oregon Apprenticeship/Training
Glenna Borg, Oregon Department of Human Resources
Nita Crimins, Oregon Department of Education

Philip Dean, Project YESS, JTPA
Maureen Dooney, Oregon Dept. of Human Resources

CAREER PATHWAYS FOR CAM PROGRAMS

The Oregon Department of Education has prescribed the following career pathways for the Certificate of Advanced Mastery (CAM) programs*:

Arts and Communications

Programs related to the humanities and to the performing, visual, literary, and media arts. These may include, but need not be limited to, architecture, creative writing, film and cinema studies, fine arts, graphic design and production, journalism, foreign languages, radio and television broadcasting, advertising, and public relations.

Business and Management

Programs related to the business environment. These may include, but need not be limited to, entrepreneurship, sales, marketing, hospitality and tourism, computer/information systems, finance, accounting, personnel, economics, and management.

Health Services

Programs related to the promotion of health as well as the treatment of injuries, conditions, and disease. These may include, but need not be limited to, medicine, dentistry, nursing, therapy and rehabilitation, nutrition, fitness, and hygiene.

Human Resources

Programs related to economic, political, and social systems. These may include, but need not be limited to, education, law and legal studies, law enforcement, public administration, child and family services, religion, and social services.

Industrial and Engineering Systems

Programs related to the technologies necessary to design, develop, install, or maintain physical systems. These may include, but need not be limited to, engineering and related technologies, mechanics and repair, manufacturing technology, precision production, and construction.

Natural Resource Systems

Programs related to the environment and natural resources. These may include, but need not be limited to, agriculture, earth sciences, environmental sciences, fisheries management, forestry, horticulture, and wildlife management.

---

* Taken from the Oregon Department of Education *Oregon 21st Century Schools* brochures, Normal Paulus, State Superintendent of Public Instruction.

TECH PREP ARTICULATION AGREEMENTS

(Total Agreements: 78)

CAM: ARTS and COMMUNICATIONS

PROGRAM	NUMBER OF AGREEMENTS	HIGH SCHOOLS	
Cable and Community Television	4	David Douglas Gresham	Reynolds Sam Barlow
Graphics Technology	1	Reynolds	
Journalism	4	Corbett David Douglas	Gresham Reynolds

CAM: BUSINESS and MANAGEMENT

PROGRAM	NUMBER OF AGREEMENTS	HIGH SCHOOLS	
Accounting	7	Centennial David Douglas Gresham Parkrose	Reynolds Sam Barlow Sandy
Computer Applications	1	Sandy	
Entrepreneurship/Small Business Management	3	Centennial Sam Barlow	Sandy
Hospitality/Tourism	8	Centennial David Douglas Gresham Parkrose	Reynolds Roosevelt Sam Barlow Sandy
Marketing/DECA	5	Centennial Corbett Gresham	Sam Barlow Sandy
Office Occupations	8	Centennial Corbett David Douglas Gresham	Parkrose Reynolds Sam Barlow Sandy

BENCHMARKS AND MILESTONES

CAM: HUMAN RESOURCES

PROGRAM	NUMBER OF AGREEMENTS	HIGH SCHOOLS
Early Childhood Education	6	David Douglas Gresham Parkrose Reynolds Sam Barlow Sandy

CAM: INDUSTRIAL and ENGINEERING SYSTEMS

PROGRAM	NUMBER OF AGREEMENTS	HIGH SCHOOLS
Automotive	6	Centennial David Douglas Gresham Reynolds Sam Barlow Sandy
Electronics	4	Centennial David Douglas Gresham Sam Barlow
Engineering Technology (Drafting)	8	Centennial Corbett David Douglas Gresham Parkrose Reynolds Sam Barlow Sandy
Manufacturing Technology	6	Centennial Gresham Parkrose Reynolds Sam Barlow Sandy
Welding Technology	4	Centennial Gresham Parkrose Sam Barlow

CAM: NATURAL RESOURCES SYSTEMS

PROGRAM	NUMBER OF AGREEMENTS	HIGH SCHOOLS
Agriculture/Horticulture	3	David Douglas Sam Barlow Sandy

NOTE: For the **HEALTH SERVICES CAM**, currently all agreements are set up through the VIP program in cooperation with other Portland-area high schools that offer courses in the CAM.

NUMBER OF STUDENTS TRANSCRIPTING CREDIT
by 2+2 Tech Prep Program
1987-1994

TOTAL STUDENTS PER SCHOOL YEAR

PROGRAMS	1987 1988	1988 1989	1989 1990	1990 1991	1991 1992	1992 1993	1993 1994	Cumulative TOTALS
Accounting	5	4	3	3	0	0	0	15
Automotive	*	*	*	8	4	0	0	12
Computer Science	*	*	*	*	33	46	33	112
Drafting/CAD	*	*	*	18	0	0	4	22
Early Childhood Education	*	14	20	12	70	20	19	155
Electronics	1	0	0	0	0	0	13	14
Engineering	*	*	*	*	*	*	16	16
Forestry	*	*	*	*	*	2	0	2
Graphics	*	*	*	*	*	*	8	8
Horticulture	*	*	*	*	*	1	0	1
Hospitality/Tourism	*	*	16	40	41	35	22	154
Manufacturing	*	1	0	10	5	7	11	34
Marketing	*	*	*	*	*	2	13	15
Office Occupations	35	52	45	71	83	151	236	673
Welding	*	2	0	17	4	9	23	55
Work Experience	*	*	*	*	12	56	64	132
Total Enrollments	**41**	**73**	**84**	**176**	**252**	**329**	**462**	**1,440**
Total Transcripted Credits	**109**	**224**	**292**	**498**	**578**	**727**	**931**	**3,359**

* Marked years are those in which this program was not offered as a transcripted credit course.

OVERALL INCREASE in enrollment from 1987 to 1994 . . . 754 PERCENT

NUMBER OF STUDENTS TRANSCRIPTING 2+2 CREDIT
by High School
1987-1994

TOTAL STUDENTS PER SCHOOL YEAR

HIGH SCHOOLS	1987 1988	1988 1989	1989 1990	1990 1991	1991 1992	1992 1993	1993 1994	Cumulative TOTALS
Centennial	3	5	5	3	7	63	97	183
Corbett	*	4	0	9	7	9	14	43
David Douglas	36	47	38	35	35	43	43	277
Gresham	3	0	4	35	35	12	20	109
MHCC - Health Occ.**	*	*	*	*	*	42	54	96
Parkrose	*	4	21	26	50	27	6	134
Reynolds	3	2	8	23	20	43	84	183
Roosevelt	*	*	*	*	*	*	1	1
Sam Barlow	5	6	0	30	7	4	84	136
Sandy	*	2	10	22	59	73	93	259
Scappose	*	*	*	*	*	*	6	6
Springdale	*	*	*	*	*	10	14	24
Total Annual Enrollment	**50**	**70**	**86**	**183**	**220**	**326**	**516**	**1,451**

* Marked years are those in which this program was not offered as a transcripted credit course.

** These are duplicated within high school breakdowns in this chart.

OVERALL INCREASE in enrollment from 1987 to 1994 . . . 932 PERCENT

NUMBER OF V.I.P. CHOICE STUDENT APPLICATIONS by Course

1989 to 1994

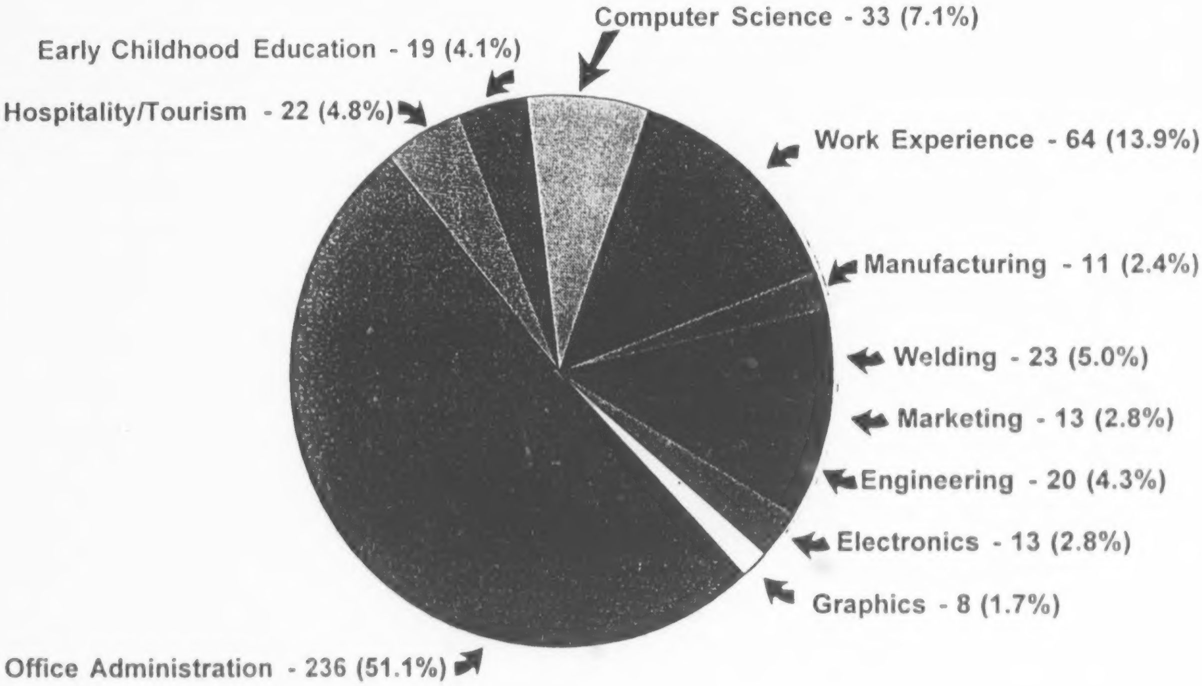
	TOTAL VIP STUDENTS PER SCHOOL YEAR						
PROGRAMS	1989 1990	1990 1991	1991 1992	1992 1993	1993 1994	1994 1995	Cumulative TOTALS
Agriculture	*	*	*	*	*	1	1
Automotive	7	10	6	8	12	7	50
Building Construction	13	16	18	19	26	32	124
Early Childhood Education	8	11	13	14	0	0	46
Electronics	1	0	2	4	3	3	13
Foods	*	*	*	*	*	13	13
Foreign Language	*	*	*	*	9	3	12
Graphics	3	0	4	6	1	1	15
Health Occupations I	*	20	39	48	192	125	424
Health Occupations II	*	*	15	18	29	29	91
Horticulture	2	1	3	4	1	3	14
Hospitality/Tourism	*	2	4	9	6	6	27
Manufacturing	*	*	*	*	1	1	2
Marketing	5	4	0	0	2	0	11
Video Technology	5	3	5	14	9	5	41
Total Enrollments	**44**	**67**	**109**	**144**	**291**	**229**	**1,287**

* Marked years are those in which this program was not offered as a transcripted credit course.

OVERALL INCREASE in enrollment from 1989 to 1994 . . . 420 PERCENT

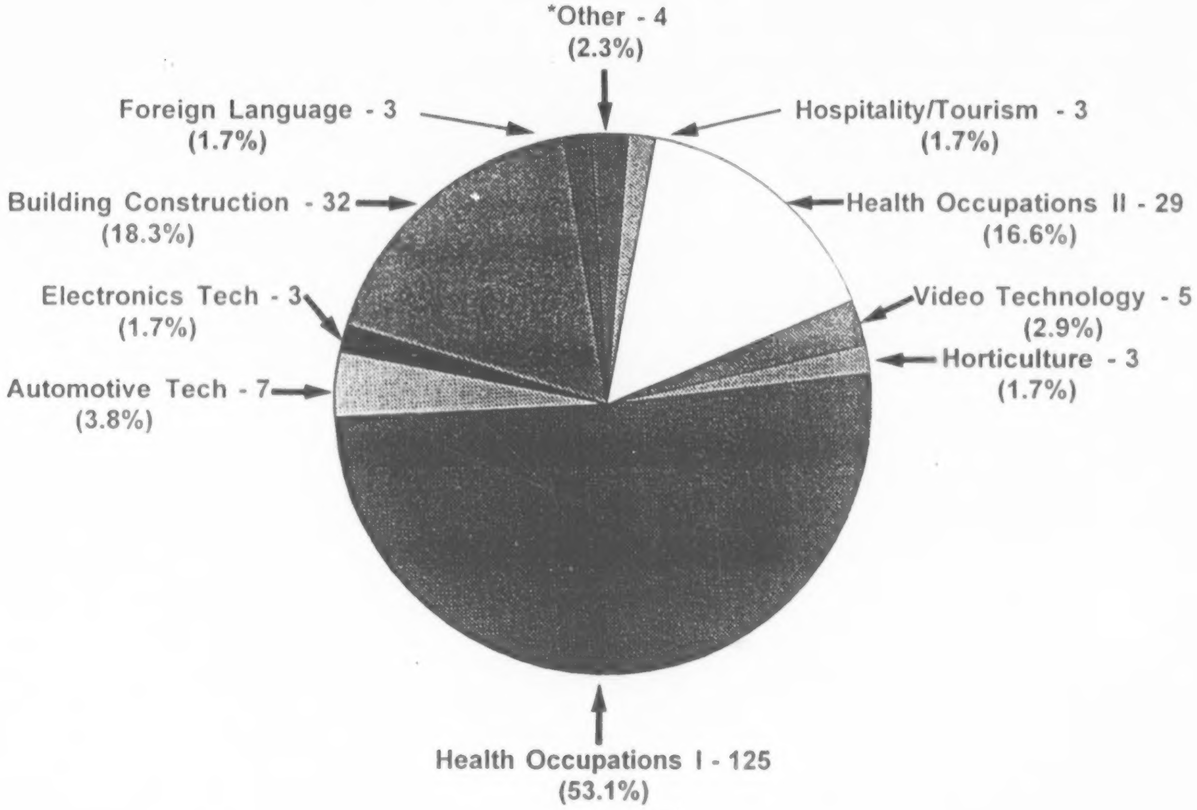
2+2 TECH PREP STUDENT TRANSCRIPTING BY PROGRAM

1993 to 1994



TOTAL: 462 Students

VIP - CHOICE
INTER-DISTRICT PROGRAM APPLICATIONS
1994 to 1995

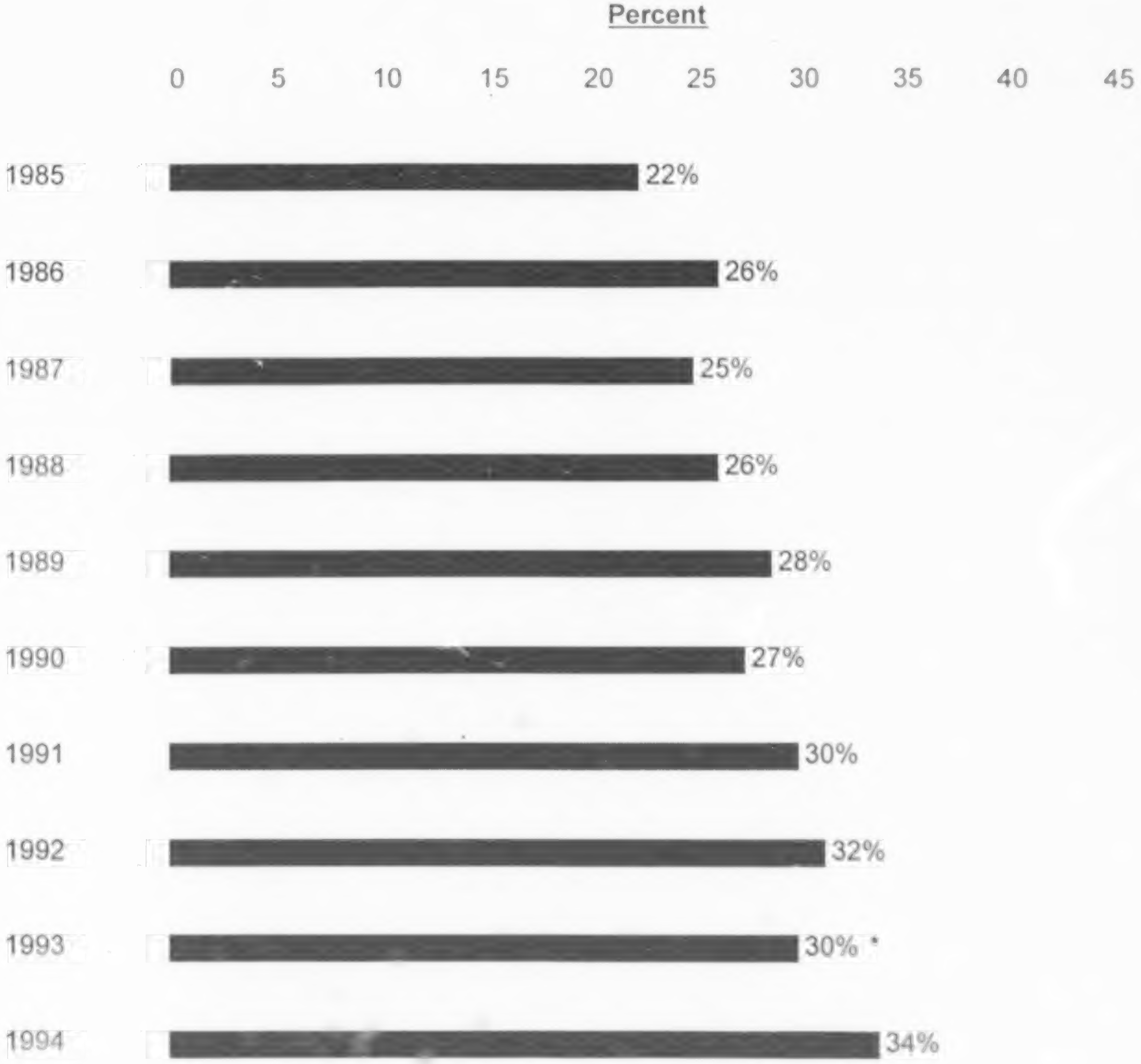


TOTAL: 214 Students

*Other:	
Agriculture	1
Foods	1
Graphics	1
Manufacgturing	1

MARKET SHARE PERCENT OF MATRICULATING FALL HIGH SCHOOL GRADUATES

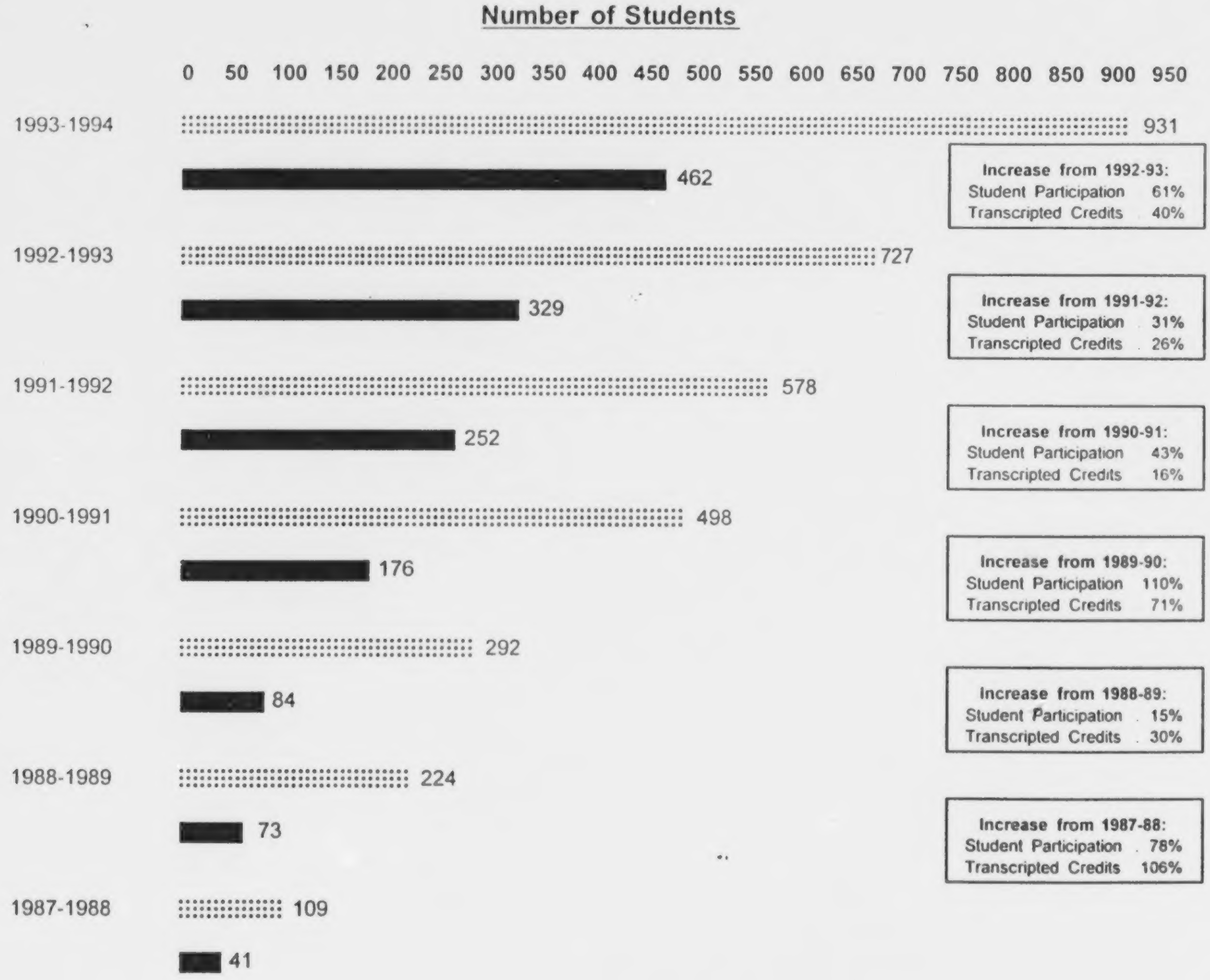
1985 to 1994



* Mt. Hood Community College registered a 36 percent market share of Reynolds High School graduates.

STUDENT PARTICIPATION CREDIT TRANSCRIPTION

1987-1988 to 1993-1994



Increase from 1992-93:
Student Participation 61%
Transcripted Credits 40%

Increase from 1991-92:
Student Participation 31%
Transcripted Credits 26%

Increase from 1990-91:
Student Participation 43%
Transcripted Credits 16%

Increase from 1989-90:
Student Participation 110%
Transcripted Credits 71%

Increase from 1988-89:
Student Participation 15%
Transcripted Credits 30%

Increase from 1987-88:
Student Participation 78%
Transcripted Credits 106%

LEGEND:

▨ Transcripted Credits
■ Student Participation

SEVEN-YEAR INCREASE

Student Participation 1,027%
Transcripted Credits 567%

BEST COPY AVAILABLE

VISIONS FOR THE FUTURE

VISIONS FOR THE FUTURE

A dynamic local, state, and national movement to develop Tech Prep programs and to reform education is underway. These changes in Oregon education, mandated by the legislature, have inspired a clear vision of the next two decades. This vision places an increasing emphasis on real-world skills and contextual learning.

Oregon's vision, as expressed in *Oregon Shines* and in *Oregon Benchmarks*, is to have the best educated work force in the nation by the year 2000 and the best educated work force in the world by the year 2010. Oregon House Bill 3565, passed in June 1991 by the Oregon Legislature, mandates educational reform consistent with many of the recommendations expressed in the national report, *America's Choice*. Other major factors influencing education reform include the new recommendations and standards approved by the National Council of Teachers of Mathematics (NCTM) and the recently approved standards recommended by the American Association for the Advancement of Science. Both of these complement the reform of education that is reflected in the Tech Prep movement.

The Mt. Hood Regional Cooperative Consortium is nationally known for its leadership and accomplishments in Tech Prep education and in Oregon's reform movement. The Consortium will continue to focus on Tech Prep and education reform well into the year 2010, emphasizing at all levels of education the development of integrated curriculums, teamwork, and real-life applications for mastering academic skills. The Consortium will also promote and support school-to-work opportunities through cooperation with local business and industry.

In May 1994, the Mt. Hood Regional Cooperative Consortium held its annual one-day retreat and planning session to evaluate progress and to develop a program of work for 1994-1995 to address these challenges and opportunities. At the regularly scheduled fall meeting in September 1994, the Consortium finalized its priorities and established responsibilities. The 1994-95 Program of Work, presented on the following pages, is a result of these efforts.

PROGRAM OF WORK

1994 to 1995

CAM DEVELOPMENT and SCHOOL-TO-WORK

1. CAM Development Sub-Committee Members:

Kathy Lillis, Vocational Coordinator	David Douglas High School
Gaynelle Nolf, Principal	Parkrose High School
Barbara Ritt, Assistant Principal	Parkrose High School
Deanna Sawtelle, Voch-Tech Chair	Centennial High School
Roger Schoenborn, Occupational Specialist	Portland Public Schools
Vickie Schray, Director, Pro-Tech Education	MHCC
Ed Smith, Principal	Reynolds High School
Roger Swenson, Instructor	Corbett High School
Bobbie Thomas, Coordinator, School/Business Partnership	Sam Barlow High School
Tim Tutty, Vice Principal	Gresham High School

2. School-to-Work Sub-Committee Members:

Joanne Bishop, Associate Principal	Centennial High School
Glenna Borg, Customer Service/Employee Relations	Oregon Dept. of Human Resources
Philip Dean, Project YESS Director	MHCC
John Deeder, Assistant Superintendent	Reynolds District Administration
Keith Eisele, Business/Vocational Division Leader	Gresham High School
Linda Gutierrez	Parkrose District Administration
Bob Harland, Director of Administrative Services	Gresham-Barlow School District
Rhonda Kjargaard, Principal	Alpha High School
Kathy Lillis, Vocational Coordinator	David Douglas High School
Gaynelle Nolf, Principal	Parkrose High School
Mike O'Connor, Work Experience Coordinator	Sandy High School
Susen Ritchey	Multnomah ESD
Jim Rodgers, Assistant Principal	Reynolds High School
Jeff Roehm, Associate Dean, Allied Health	MHCC
Deanna Sawtelle, Voch-Tech Chair	Centennial High School
Vickie Schray, Director, Pro-Tech Education	MHCC
Dave Shields, Director, Career Placement	MHCC
Jerry Shiveley, Deputy Superintendent	Multnomah ESD
Bobbie Thomas, Coordinator, School/Business Partnership	Sam Barlow High School
Lynne Wolters, Tech Prep Coordinator, Engineering	MHCC

BENCHMARKS AND MILESTONES

EVALUATION AND ASSESSMENT

Evaluation and Assessment Committee Members:

Vern Halcromb, Regional Coordinator	Mt. Hood Consortium
Tom Owens, Associate Director, Education & Work Program	NW Regional Educational Laboratory
Jeff Roehm, Associate Dean, Allied Health	MHCC

GUIDANCE AND COUNSELING

Guidance and Counseling Committee Members:

Joanne Bishop, Associate Principal	Centennial High School
Debbie Derr, Coordinator of Disability Services	MHCC
Kathy Lillis, Vocational Coordinator	David Douglas High School
Kathleen Waldron, Counselor	MHCC

MARKETING

Marketing Committee Members:

Dave Shields, Director, Career Placement	MHCC
Lynn Sondenaa, Industrial Technology Strand Coordinator	Sandy High School
Roger Swenson, Instructor	Corbett High School

STAFF DEVELOPMENT

Staff Development Committee Members:

John Deeder, Assistant Superintendent	Reynolds District Administration
Jim Dixon, Associate Principal, Curriculum	David Douglas High School
Marv Hempel, Director of Instruction	Centennial School District
Bobbie Thomas, Coordinator, School/Business Partnership	Sam Barlow High School

FOR FURTHER INFORMATION, CONTACT:

Michael Dillon, Dean
Community and Workforce Development

Mt. Hood Community College
26000 SE Stark Street
Gresham, OR 97030

(503) 667-7225
(503) 667-7679 (FAX)

Dr. Vern Halcromb
The Mt. Hood Regional Consortium Coordinator

Mt. Hood Community College
26000 SE Stark Street
Gresham, OR 97030

(503) 669-6948
(503) 667-7679 (FAX)

1994 First Printing

Appendix G

SAMPLE PACKETS OF APPLIED MATHEMATICS, APPLIED ECONOMICS, AND APPLIED ENGLISH

Teaching Mathematics in a 21st Century School

One-Track Mathematics Curriculum for All

Presented by
Pamela E. Matthews, Associate Dean
Mathematics Division
Mt Hood Community College

National Tech Prep Network
Fall Conference
Atlanta, Georgia
September 28, 1993

Table of Contents

Page

I. **What is Mathematics? and What Must Change?** 1

Quotes from *Everybody Counts* 2-5

II. **Comparison of NCTM and SCANS: Industry Expectations** 6-11

III. **Summary of NCTM Curriculum Standards Grades 5-12** 12-17

IV. **Application-Based, Technology-Supported, Student-Centered Mathematics Curriculum** 18

Impact of Technology on Curriculum 19

Interactive Mathematics—One-Track Sequence 20

NCTM Standards for a Four-Level, One-Track Mathematics Sequence 21-29

MHCC College Prep/Tech Course Sequence 30

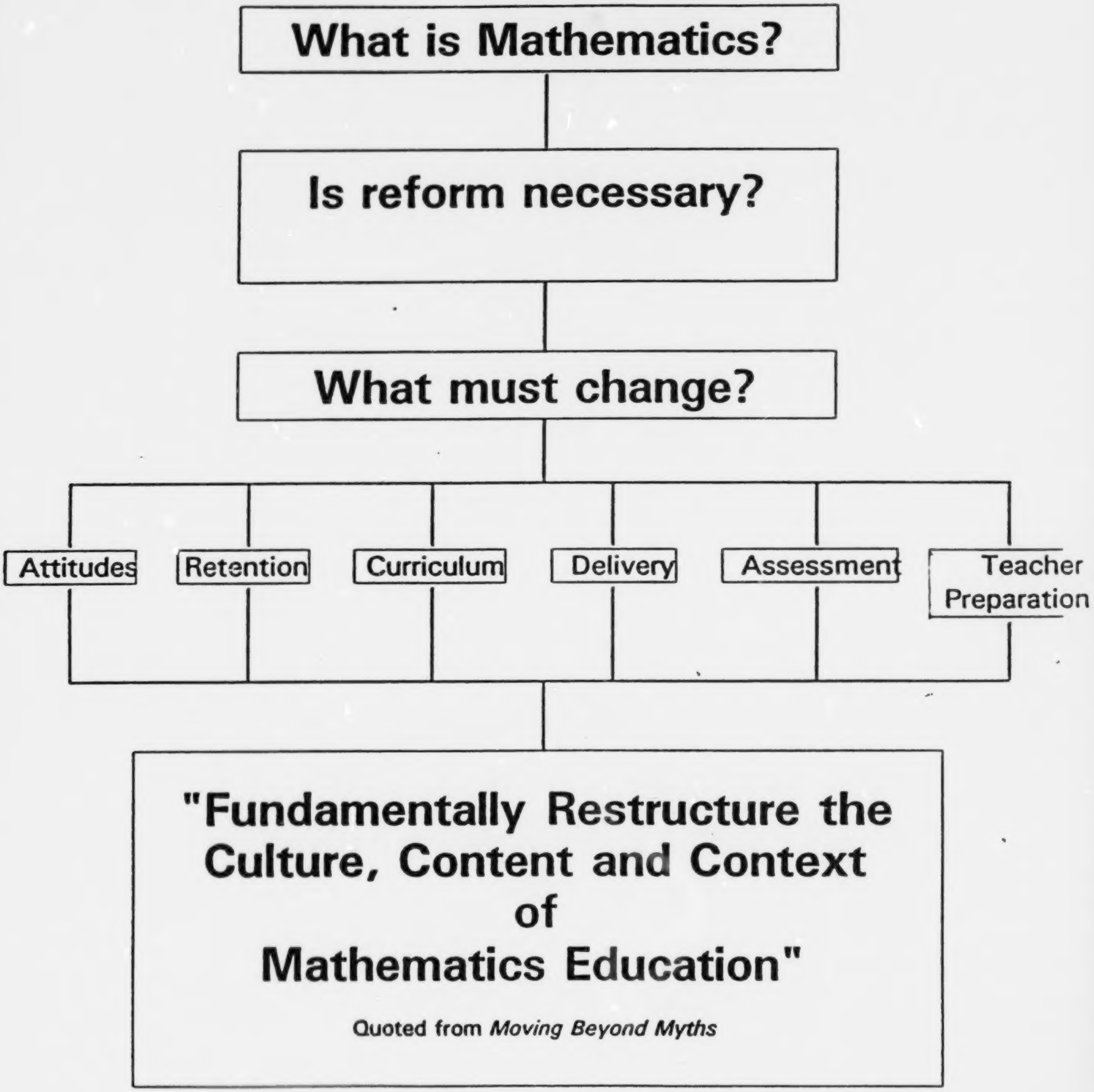
Course Descriptions for the MHCC Levels I-III 31-34

Draft Copy of Tolleson High School's Interactive Mathematics Levels I-IV 35-37

V. **How Students Learn** 48-51

VI. **Graphing Calculator Activities** 52-62

VII. **References** 63-64



What is Mathematics?

Is reform necessary?

What must change?

Attitudes

Retention

Curriculum

Delivery

Assessment

Teacher Preparation

"Fundamentally Restructure the Culture, Content and Context of Mathematics Education"

Quoted from *Moving Beyond Myths*

WHAT IS MATHEMATICS?

QUOTED FROM *EVERYBODY COUNTS*:

Mathematics is the key to opportunity. p 1

Mathematics reveals hidden patterns that help us understand the world around us. p 31

As a practical matter, mathematics is a science of pattern and order. p 31

Mathematics is the invisible culture of our age. p 32

Mathematics is one way we make sense of things. p 43

As a science of abstract objects, mathematics relies on logic rather than on observation as its standard of truth. p 31

Mathematics is a natural mode of human thought, better suited to certain types of problems than to others, yet always subject to confirmation and checking with other types of analyses. There is no place in a proper curriculum for mindless mimicry mathematics.
p 44

More than most other school subjects, mathematics offers special opportunities for children to learn the power of thought as distinct from the power of authority.
p 4

Modern mathematics provides a powerful instrument of understanding the world in which we live. p 4

Mathematics today involves far more than calculation; clarification of the problem, deduction of consequences, formulation of alternatives, and development of appropriate tools are as much a part of the modern mathematician's craft as are solving equations or providing answers. p 5

WHAT IS MATHEMATICS EDUCATION?

Among the many subjects taught in school mathematics is probably the most universal, depending least on a student's background and culture. p 20

Education in any discipline helps students learn to think, but education also must help students take responsibility for their thoughts. While this objective applies to all subjects, it is particularly apt in mathematics education because mathematics is an area in which even young children can solve a problem and have confidence that the solution is correct—not because the teacher says it is, but because its inner logic is so clear. p 3

The study of mathematics can help develop critical habits of mind—to distinguish evidence from anecdote, to recognize nonsense, to understand chance, and to value proof. p 8

Experience with mathematical modes of thought builds mathematical power—a capacity of mind of increasing value in this technological age that enables one to read critically, to identify fallacies, to detect bias, to assess risk, and to suggest alternatives. Mathematics empowers us to understand better the information-laden world in which we live. p 31-32

Doing mathematics is much like writing. In each, the final product must express good ideas clearly and correctly, but the ideas must be present before the expression can take form. Good ideas poorly expressed can be revised to improve their form; curriculum that emphasizes computation and rules is like a writing curriculum that emphasizes grammar and spelling; both put the cart before the horse. p 44

WHAT MUST CHANGE AND WHY?

CURRICULUM DESIGN

Communication has created a world economy in which working smarter is more important than merely working harder. p 1

We have inherited a mathematics curriculum conforming to the past, blind to the future, and bound by a tradition of minimum expectations. Wake Up America!
p 1

Even more important is a comprehensive flexible view that embodies the intrinsic unity of mathematics: estimation supplements calculation; heuristics aid algorithms; experience balances innovation. To prepare students to use mathematics in the twenty-first century, today's curriculum must invoke the full spectrum of the mathematical sciences. p 43

In practice, although not in law, we have a national curriculum in mathematics education. It is an "underachieving" curriculum that follows a spiral of almost constant radius, reviewing each year so much of the past that little new learning takes place. p 45

Mathematical literacy is especially crucial because mathematics is the language of science and technology. p 8

The world of work in the twenty-first century will be less manual but more mental; less mechanical but more electronic; less routine but more verbal; and less static but more varied. p 11

We must judge schools not by remembrances of things past, but by necessary expectations for the future. Students must learn not only arithmetic, but also estimation, measurement, geometry, optimization, statistics, and probability—all of the ways in which mathematics occurs in everyday life.
p 46

They need to learn not only how to estimate and calculate, but also how to decide whether to estimate or calculate. Good number sense includes common sense about how to find an answer as well as a range of choices of methods. p 47

Children should use calculators throughout their school work, just as adults use calculators throughout their lives. More important, children must learn when to use them and when not to do so. They must learn from experience with calculators when to estimate and when to seek an exact answer; how to estimate answers to verify the plausibility of calculator results; and how to solve modest problems mentally when neither pencil nor calculator is convenient. p 47

DELIVERY SYSTEMS

Mathematics education takes place in the context of schools. Like other subjects, mathematics is constrained by limits of school and society, of texts and tests. p 3

Mathematics instruction must not reinforce the common impression that the only problems amenable to mathematical analysis are those that have unique correct answers. p 44

The best time to learn mathematics is when it is first taught: the best way to teach mathematics is to teach it well the first time. p 1
Research on learning shows that most students cannot learn mathematics effectively by only listening and imitating; yet most teachers teach mathematics just this way. p 6

4

Much of the failure in school mathematics is due to a tradition of teaching that is inappropriate to the way most students learn. p 6

Mathematics is the worst curricular villain in driving students to failure in school. When mathematics acts as a filter, it not only filters students out of careers, but frequently out of school itself. p 7

Without the ability to read and understand, no one can become mathematically literate. Increasingly, the reverse is also true: without the ability to understand basic mathematical ideas, one cannot fully comprehend modern writing such as that which appears in the daily newspapers. p 7

Evidence from many sources shows that the least effective mode for mathematics learning is the one that prevails in most of America's classrooms: lecturing and listening. Despite daily homework, for most students and most teachers mathematics continues to be primarily a passive activity: teachers prescribe; students transcribe. p 57

It is students' acts of construction and invention that build their mathematical power and enable them to solve problems they have never seen before. p 59

To assess development of a student's mathematical power, a teacher needs to use a mixture of means: essays, homework, projects, short answers, quizzes, blackboard work, journals, oral interviews, and group projects. Only broad-based assessment can reflect fairly the important, higher-order objectives of mathematics curricula. p 70

ATTITUDES

Unfortunately, as children become socialized by school and society, they begin to view mathematics as a rigid system of externally dictated rules governed by standards of shifts gradually from enthusiasm to apprehension, from confidence to fear. p 44

One of the more disturbing conclusions of recent studies of mathematics education is that the American public tends to assume that differences in accomplishment in school mathematics are due primarily to differences in innate ability rather than to differences in individual effort or in opportunity to learn. p 9

Another consequence is that adults who determine policy in mathematics education often measure the mathematical needs of today's students by their own meager and outdated mathematical accomplishments. p 9-10

Others have been made apprehensive by a teacher's rigid view of mathematics as a string of procedures to be memorized, where right answers count more than right thinking. p 10

Calculators now do most of the arithmetic needed for daily life, while a technology dominated society requires that everyone have a good grasp of chance, of reasoning, of form, and of pattern. p 46

High school graduates need to know enough about chance to understand health and environmental risks; enough about change and variability to understand investments; enough about data and experiments to understand the grounds for scientific conclusions; enough about representation to interpret graphs; and enough about the nature of mathematics to be supportive parents to their children who will learn aspects of mathematics that their parents never studied. p 49

As a subject with an extensive and substantial history, mathematics more than any other science has been taught as an ancient discipline. A nation that persists in this view of mathematics is destined to fall behind scientifically and economically. p 76

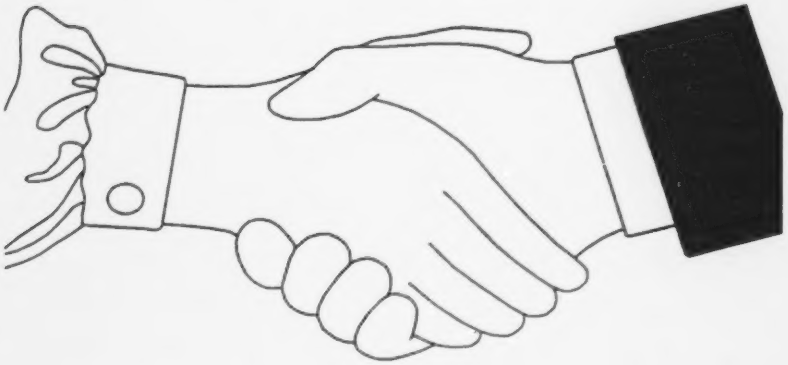
5

National
Council of
Teachers of
Mathematics

NCTM

Secretary's
Commission on
Achieving
Necessary
Skills

SCANS



"*Everybody Counts*"

Curriculum & Evaluation Standards for Mathematics

"NCTM Standards"

"A Core Curriculum Grades 9-12"

NCTM Addenda Series

Reshaping Content

In contrast to current practice of prematurely tracking students into either college preparatory sequences or "general mathematics" sequences on the basis of narrow perceptions of performance or curricular goals, the *Standards* recommends at least three years of mathematical study for every student "revolv[ing] around a core curriculum differentiated by the depth and breadth of the treatment of topics and by the nature of applications." Thus, the core topics of high school mathematics are to be fundamentally the same for *all* students.

The curriculum standards for grades 9-12 identify a common core of mathematics topics that *all* students should have the opportunity to learn. The broadening of the content of the curriculum is accompanied by a broading of its focus. Narrow curricular expectations of memorizing isolated facts and procedures and becoming proficient with by-hand calculations and manipulations give way to developing mathematics as a connected whole with an emphasis on conceptual understanding, multiple representations and their linkages, mathematical modeling, and problem solving.

As envisioned in the *Curriculum and Evaluation Standards*, investigation of patterns, data analysis, and modeling serve to connect mathematics to the world in which students live. Coordinate representations connect data analysis with algebra, algebra with geometry, and geometry with trigonometry. Computer and calculator graphics not only bring these connections to the forefront of the curriculum but also allow students to investigate connections in a dynamic way. Moreover, the visualization approach offered by these technologies promises to afford more students greater access to mathematics.

Addenda Series - A Core Curriculum - Page v

The implications for school mathematics of the changes occurring in mathematics and its applications are likely to be far-reaching. The study of topics from probability and statistics has assumed increasing importance to the fields of behavioral and social sciences. Discrete mathematics, the mathematics of dynamical systems (chaos), and mathematical computing must supplement the traditional precalculus curriculum to provide an accurate background and understanding of the way that mathematics is applied to real-world problems. The growing connections among mathematical topics and with other fields raise serious questions about the way that we package the high school curriculum into discrete subjects—making us one of the few industrialized countries of the world that do not organize and teach mathematics as an integrated discipline.

Addenda Series - Page 2

Reshaping Pedagogy

The *Curriculum and Evaluation Standards* paints mathematics as an activity and a process, not simply as a body of content to be mastered. To this end, the standards for grades 9-12 call for increased attention to—

- actively involving students in constructing and applying mathematical ideas;
- using problem solving as a means as well as a goal of instruction;
- promoting student interaction through the use of effective questioning techniques;
- using a variety of instructional formats—small cooperative groups, individual explorations, whole-class instruction, and projects;
- using calculators and computers as tools for learning and doing mathematics.

Addenda Series - Pages vi vii

Reshaping Assessment

Complete pictures of classrooms in which the *Curriculum and Evaluation Standards* is being implemented not only show changes in mathematical content and instructional practice but also reflect changes in the purpose and methods of student assessment. Classrooms where students are expected to be engaged in mathematical thinking and in constructing and reorganizing their own knowledge require adaptive teaching informed by observing and listening to students at work. Thus informal, performance-based assessment methods are essential to the new vision of school mathematics.

Analysis of students' written work remains important. However, single-answer paper-and-pencil tests are often inadequate to assess the development of students' abilities to analyze and solve problems, make connections, reason mathematically, and communicate mathematically. Potentially richer sources of information include student-produced analyses of problem situations, solutions to problems, reports of investigations, and journal entries. Moreover, if calculator and computer technologies are now to be accepted as part of the environment in which students learn and do mathematics, these tools should also be available to students in most assessment situations.

Addenda Series - Page vii

Needs in a Postindustrial Society

Lack of competence in mathematics beyond arithmetic now limits an individual's opportunity for success in life and a nation's economic strength and leadership potential. Virtually every area of life requires a higher competence with mathematics for full participation in society. The ability to understand significant mathematics and mathematical procedures is necessary for making informed judgments on issues, acting as a wise consumer, and coming to personal and business decisions. Lack of success in high school level mathematics and beyond now eliminates graduates from all but the most menial dead-end jobs.

Addenda Series - Page 3

There is more at issue than our economic self-interest. Education is closely linked to preserving our democratic ideas. A common core of knowledge, skills, and values is necessary to maintain our beliefs in the underpinnings of our society. The growth of an underclass of the long-term unemployed, dominated by particular subcultures, is intolerable. Aside from the attendant welfare dependency, crime, and social unrest, the notion of large segments of our society limited in their opportunities to participate fully in the mainstream of American life runs contrary to the principles that our nation represents.

Addenda Series - Pages 4,5

Equally at risk is our capacity to govern ourselves wisely and to act responsibly as individuals. The problems of a modern technological society are complex, requiring an electorate who can sift through arguments, interpret quantitative information, make critical judgments, and look beyond immediate self-interest. The abilities to reason and to think and act independently are survival skills for being wise consumers, food stewards of the environment, intelligent supporters of rational policies of government, and citizens capable of appreciating cultural differences.

Addenda Series - Page 5,6

Mathematical literacy to function in a technological society can no longer be the goal of an elite subset of the school population. Every student must be equipped with the knowledge and skills to make sense of data, to interpret technical materials, to understand linear and nonlinear growth, to manipulate formulas and algebraic symbols, to distinguish logical arguments, to appreciate and act on uncertainty, and to apply geometric principles. Each individual must be equipped with a combination of personal skills, technological skills, and thinking skills in order to apply mathematics meaningfully. These are the prerequisites for understanding the world in which we live, for realizing the potential of technology, and for maintaining our system of government.

Addenda Series - Page 6

INDUSTRY EXPECTATIONS FOR SCHOOL MATHEMATICS

- The ability to set up problems with the appropriate operations
- Knowledge of a variety of techniques to approach and work on problems
- Understanding of the underlying mathematical features of a problem
- The ability to work with others on problems
- The ability to see the applicability of mathematical ideas to common and complex problems
- Preparation for open problem situations, since most real problems are not well formulated
- Belief in the utility and value of mathematics

(Pollak 1987)

1991 National Council of Teachers of Mathematics

9

TEACHING THE *SCANS* COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills

U.S. Department of Labor, 1993

In considering the timing for introducing SCANS skills, students should not specialize too early-- that is, pursue a specific occupation or field to the exclusion of others-- but should *begin by developing the fundamental conceptual foundation and skills that will allow them to acquire more specialized skills later on.* From the beginning, instruction in this conceptual foundation should be integrated with the core subject areas.

The model is that of a spiral. Each SCANS competency is developed throughout the K-12 curriculum. (p17)

Curriculum and instruction in the SCANS competencies

RESOURCES

By acquiring competence at allocating resources (*time, money, people, and materials)* students should learn to perform some of the basic functions of management--planning, organizing, and controlling. (p 21-22)

INFORMATION

In the past, schools have seen as a major part of their job the conveying of information to students. Though it is still important for students to acquire certain information, it is becoming more and more important for them to acquire the skills of *finding, evaluating, compiling, packaging and communicating information.* (p27)

The student should be able to:

- Acquire and evaluate information
- Organize and maintain information
- Interpret and communicate information
- Use computers to process information

INTERPERSONAL SKILLS

In both the academic curriculum and extracurricular activities, essential interpersonal skills to prepare the student for the workplace are:

to be able to

- Participate as a member of team
- Teach others
- Serve clients and customers
- Exercise leadership
- Negotiate to arrive at a decision
- Work with cultural diversity

SYSTEMS

Understanding systems makes it easier to understand the ways in which many of the world's processes take place. In addition to understanding systems, SCANS competencies state students should be able to monitor and correct performance in systems and to design and improve them.

TECHNOLOGY

The SCANS definition of technological competence requires developing the ability to *understand* computers, machines, and other tools and to *use* them to solve problems. In addition, students should be able to select, apply, maintain and troubleshoot technology.

KEY POINTS OF THE NCTM STANDARDS

1. All students need to learn more and often different mathematics, and instruction must be significantly revised. p 1

2. The call for reform in mathematics education indicates new goals are needed for both the student and the teacher. p 3

3. We live in an informational society rather than an industrial one:

   Businesses no longer seek workers with strong backs, clever hands and shopkeeper arithmetic skills, instead employees must be prepared to understand the complexities and technologies of communication, assimilate unfamiliar information, ask questions and work cooperatively in teams. p 3

4. Goals for the student:

   a. Learn to value mathematics
   b. Be confident in their ability to do mathematics
   c. Become mathematical problem solvers
   d. Learn to communicate mathematically
   e. Learn to reason mathematically p 5

What a student learns depends to a great degree on how he or she has learned it. p 5

a. Knowing mathematics is doing mathematics.
b. Some aspects of doing mathematics have changed in the last decade.
c. Changes in technology and the broadening of the areas in which mathematics is applied have resulted in growth and changes in the discipline of mathematics itself. p 7

"Calculators and computers for users of mathematics, like word processors for writers, are tools that simplify, but do not accomplish, the work at hand." p 8

The standards for grades 9-12 students represent a core program for all students, with explicit differentiation in terms of depth of breadth of treatment and the nature of applications for college-bound students. However, the mathematics of the core program is sufficiently broad and deep so that students' options for further study would not be limited. p 9

The standards specify that instruction should be developed from problem situations. Students should be able to develop a framework of support that can be drawn upon in the future, when "rules" have long been forgotten. p 11

12

GRADES 5-8

An ideal 5-8 mathematics curriculum would expand students' knowledge of numbers, computation, estimation, measurement, geometry, statistics, probability, patterns and functions, and the fundamental concepts of algebra. p 65

Why should grades 5-8 mathematics extend beyond mastery of computational skills?

1. Basic skills today and in the future mean far more than computational proficiency. Moreover, the calculator renders obsolete much of the complex paper-and-pencil proficiency traditionally emphasized in mathematics courses. Topics such as geometry, probability, statistics and algebra have become increasingly more important and accessible to students through technology. p 66

2. If students have not been successful in "mastering" basic computational skills in previous years, why should they be successful now, especially if the same methods that failed in the past are merely repeated? In fact, considering the effect of failure on students attitudes, we might argue that further efforts toward mastering computational skills are counterproductive. p 66

3. Many of the mathematics topics that are omitted actually can help students recognize the need for arithmetic concepts and skills and provide fresh settings for their use. For example, in probability, student have many opportunities to add and multiply fractions. p 66

Taken from *Curriculum and Evaluation Standards for School Mathematics*
National Council of Teachers of Mathematics

SUMMARY OF CHANGES IN CONTENT AND EMPHASIS IN 5-8 MATHEMATICS

INCREASED ATTENTION	*DECREASED ATTENTION*
PROBLEM SOLVING ♦ Pursuing open-ended problems and extended problem-solving projects ♦ Investigating and formulating questions from problem situations ♦ Representing situations verbally, numerically, graphically, geometrically, or symbolically	**PROBLEM SOLVING** ♦ Practicing routine, one-step problems ♦ Practicing problems categorized by types (e.g., coin problems, age problems)
COMMUNICATION ♦ Discussing, writing, reading, and listening to mathematical ideas	**COMMUNICATION** ♦ Doing fill-in-the-blank worksheets ♦ Answering questions that require only yes, no, or a number as responses
REASONING ♦ Reasoning in spatial contexts ♦ Reasoning with proportions ♦ Reasoning from graphs ♦ Reasoning inductively and deductively	**REASONING** ♦ Relying on outside authority (teacher or an answer key)
CONNECTIONS ♦ Connecting mathematics to other subjects and to the world outside the classroom ♦ Connecting topics within mathematics ♦ Applying mathematics	**CONNECTIONS** ♦ Learning isolated topics ♦ Developing skills out of context
NUMBER/OPERATIONS/COMPUTATION ♦ Developing number sense ♦ Developing operation sense ♦ Creating algorithms and procedures ♦ Using estimation both in solving problems and in checking the reasonableness of results ♦ Exploring relationships among representations of, and operations on, whole numbers, fractions, decimals, integers, and rational numbers ♦ Developing an understanding of ratio, proportion, and percent	**NUMBER/OPERATIONS/COMPUTATION** ♦ Memorizing rules and algorithms ♦ Practicing tedious paper-and-pencil computations ♦ Finding exact forms of answers ♦ Memorizing procedures, such as cross-multiplication, without understanding
PATTERNS AND FUNCTIONS ♦ Identifying and using functional relationships ♦ Developing and using tables, graphs, and rules to describe situations ♦ Interpreting among different mathematical representations	**PATTERNS AND FUNCTIONS** ♦ Topics seldom in the current curriculum
ALGEBRA ♦ Developing an understanding of variables, expressions, and equations ♦ Using a variety of methods to solve linear equations and informally investigate inequalities and nonlinear equations	**ALGEBRA** ♦ Manipulating symbols ♦ Memorizing procedures and drilling on equation solving
STATISTICS ♦ Using statistical methods to describe, analyze, evaluate, and make decisions	**STATISTICS** ♦ Memorizing formulas
PROBABILITY ♦ Creating experimental and theoretical models of situations involving probabilities	**PROBABILITY** ♦ Memorizing formulas
GEOMETRY ♦ Developing an understanding of geometric objects and relationships ♦ Using geometry in solving problems	**GEOMETRY** ♦ Memorizing geometric vocabulary ♦ Memorizing facts and relationships
MEASUREMENT ♦ Estimating and using measurement to solve problems	**MEASUREMENT** ♦ Memorizing and manipulating formulas ♦ Converting within and between measurement systems
INSTRUCTIONAL PRACTICES ♦ Actively involving students individually and in groups in exploring, conjecturing, analyzing, and applying mathematics in both a mathematical and a real-world context. ♦ Using appropriate technology for computation and exploration ♦ Using concrete materials ♦ Being a facilitator of learning ♦ Assessing learning as an integral part of instruction	**INSTRUCTIONAL PRACTICES** ♦ Teaching computations out of context ♦ Drilling on paper-and-pencil algorithms ♦ Teaching topics in isolation ♦ Stressing memorization ♦ Being the dispenser of knowledge ♦ Testing for the sole purpose of assigning grades

Taken from *Curriculum and Evaluation Standards for School Mathemat*
National Council of Teachers of Mathematics. Page

The standards for grades 9-12 are based on the following assumptions:

- Students entering grade 9 will have experienced mathematics in the context of the broad, rich curriculum outlined in the K-8 standards.

- The level of computational proficiency suggested in the K-8 standards will be expected of all students; however, *no student will be denied access to the study of mathematics in grades 9-12 because of a lack of computational facility.*

- Although arithmetic computation will *not* be a direct object of study in grades 9-12, number and operation sense, estimation skills, and the ability to judge the reasonableness of results will be strengthened in the context of applications and problem solving, including those situations dealing with issues of scientific computation.

- *Scientific calculators* with graphing capabilities will be available to *all students at all times.*

- A computer will be available at all times in every classroom for demonstration purposes, and all students will have *access to computers* for individual and group work.

- At least *three years of mathematical study* will be required of *all* secondary school students.

- These three years of mathematical study will revolve around a *core curriculum differentiated by the depth and breadth* of the treatment of topics and by the nature of applications.

- *Four years* of mathematical study will be required of all *college-intending students.*

- These four years of mathematical study will revolve around a broadened curriculum that includes extensions of the core topics and for which *calculus is no longer viewed as* the *capstone experience.*

- All students will study appropriate mathematics during their senior year.

Taken from *Curriculum and Evaluation Standards for School Mathematics*
National Council of Teachers of Mathematics, Pages 124-125

SUMMARY OF CHANGES IN CONTENT AND EMPHASIS IN 9-12 MATHEMATICS

TOPICS TO RECEIVE INCREASED ATTENTION

ALGEBRA

- The use of real-world problems to motivate and apply theory
- The use of computer utilities to develop conceptual understanding
- Computer-based methods such as successive approximations and graphing utilities for solving equations and inequalities

GEOMETRY

- Integration across topics at all grade levels
- Coordinate and transformation approaches
- The development of short sequences of theorems
- Deductive arguments expressed orally and in sentence or paragraph form
- Computer-based explorations of 2-D and 3-D figures
- Real-world applications and modeling

TRIGONOMETRY

- The use of appropriate scientific calculators
- Realistic applications and modeling
- Connections among the right triangle ratios, trigonometric functions, and circular functions
- The use of graphing utilities for solving equations and inequalities

FUNCTIONS

- Integration across topics at all grade levels
- The connections among a problem situation, its model as a function in symbolic form, and the graph of that function
- Function equations expressed in standardized form as checks on the reasonableness of graphs produced by graphing utilities
- Functions that are constructed as models of real-world problems

STATISTICS

PROBABILITY

DISCRETE MATHEMATICS

TOPICS TO RECEIVE DECREASED ATTENTION

ALGEBRA

- Word problems by type, such as coin, digit, and work
- The simplification of radical expressions
- The use of factoring to solve equations and to simplify rational expressions
- Operations with rational expressions
- Paper-and-pencil graphing of equations by point plotting
- Logarithm calculations using tables and interpolation
- The solution of systems of equations using determinants
- Conic sections

GEOMETRY

- Euclidean geometry as a complete axiomatic system
- Proofs of incidence and betweenness theorems
- Geometry from a synthetic viewpoint
- Two-column proofs
- Inscribed and circumscribed polygons
- Theorems for circles involving segment ratios
- Analytic geometry as a separate course

TRIGONOMETRY

- The verification of complex identities
- Numerical applications of sum, difference, double-angle, and half-angle identities
- Calculations using tables and interpolation
- Paper-and-pencil solutions of trigonometric equations

FUNCTIONS

- Paper-and-pencil evaluation
- The graphing of functions by hand using tables of values
- Formulas given as models of real-world problems
- The expression of function equations in standardized form in order to graph them
- Treatment as a separate course

Taken from *Curriculum and Evaluation Standards for School Mathematics*
National Council of Teachers of Mathematics, Page 126-127

SUMMARY OF CHANGES IN INSTRUCTIONAL PRACTICES IN 9-12 MATHEMATICS

INCREASED ATTENTION to—

- The active involvement of students in constructing and applying mathematical ideas
- Problem solving as a means as well as a goal of instruction
- Effective questioning techniques that promote student interaction
- The use of a variety of instructional formats (small groups, individual explorations, peer instruction, whole-class discussions, project work)
- The use of calculators and computers as tools for learning and doing mathematics
- Student communication of mathematical ideas orally and in writing
- The establishment and application of the interrelatedness of mathematical topics
- The systematic maintenance of student learning and embedding review in the context of new topics and problem situations
- The assessment of learning as an integral part of instruction

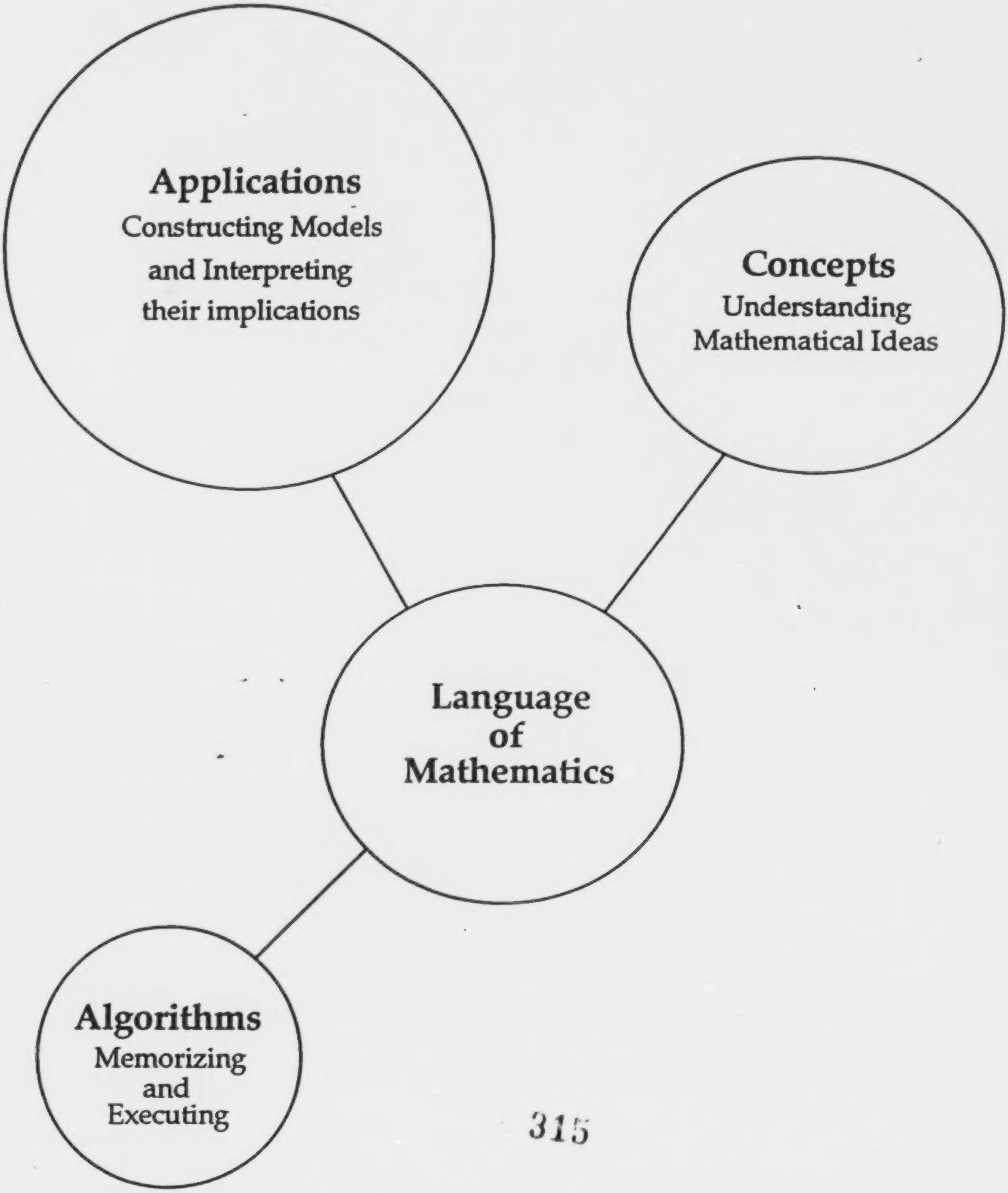
DECREASED ATTENTION to—

- Teacher and text as exclusive sources of knowledge
- Rote memorization of facts and procedures
- Extended periods of individual seatwork practicing routine tasks
- Instruction by teacher exposition
- Paper-and-pencil manipulative skill work
- The relegation of testing to an adjunct role with the sole purpose of assigning grades

Taken from *Curriculum and Evaluation Standards for School Mathematics*
National Council of Teachers of Mathematics, Page 129

Application-Based Technology-Supported
Student-Centered

TODAY'S MATHEMATICS EDUCATION



Applications
Constructing Models
and Interpreting
their implications

Concepts
Understanding
Mathematical Ideas

**Language
of
Mathematics**

Algorithms
Memorizing
and
Executing

IMPACT OF TECHNOLOGY ON THE MATHEMATICS CURRICULUM

◆ Some mathematics becomes *more important* because technology *requires* it

◆ Some mathematics becomes *less important* because technology *replaces* it

◆ Some mathematics becomes *possible* because technology *allows* it

© 1991 National Council of Teachers of Mathematics

An Entry Level One-Track Mathematics Curriculum for both the College Prep and Tech Prep Student

The Mt Hood Community College mathematics faculty believes all college prep and tech prep students should experience the same prerequisite mathematics. Prerequisite Mathematics is the minimum amount of mathematics a person needs to adequately function in a highly technological society. The following is a redistribution of the NCTM Curriculum Standards for grades 5-12 to reflect the outcomes for each level. The levels are defined as follows:

COURSE	GRADE	MHCC COURSE
Interactive Mathematics I	7, 8, 9, or CC	Mth 10/20
Interactive Mathematics II	8, 9, 10, or CC	Mth 70
Interactive Mathematics III	9, 10, 11, or CC	Mth 95
Contemporary Mathematics Technical Mathematics	10, 11, 12, or CC	Mth 105 or Mth 80/85
Interactive Mathematics IV	11, 12, or CC	Mth111/112
High School Statistics/Calculus	12	

Because the curriculum is a technology supported students should be able to investigate problem situations that arise in connection with computer/calculator validation and the application of algorithms.

INTERACTIVE MATHEMATICS I

STANDARD 1: MATHEMATICS AS PROBLEM SOLVING

The level I mathematics curriculum should include numerous and varied experiences with problem solving as a method of inquiry and application so that students can—

1. use problem-solving approaches to investigate and understand mathematical content;
2. formulate problems from situations within and outside mathematics;
3. develop and apply a variety of strategies to solve problems, with emphasis on multi-step and non-routine problems;

4. verify and interpret results with respect to the original problem situation;
5. generalize solutions and strategies to new problem situations;
6. acquire confidence in using mathematics meaningfully.

STANDARD 2: MATHEMATICS AS COMMUNICATION

The level I mathematics curriculum should include opportunity to communicate so that student can-

1. model situations using oral, written, concrete, pictorial, and graphical methods.
2. reflect on and clarify their own thinking about mathematical ideas and situations;
3. develop common understandings of mathematical ideas, including the role of definitions;
4. use the skills of reading, listening, and viewing to interpret and evaluate mathematical ideas;
5. discuss mathematical ideas;
6. appreciate the value of mathematical notation and its role in the development of mathematical ideas.

STANDARD 3: MATHEMATICS AS REASONING

Reasoning shall permeate the mathematics curriculum so that students can—

1. understand and apply reasoning processes, with special attention to spatial reasoning and reasoning with proportions and graphs;
2. validate their own thinking.

STANDARD 4: MATHEMATICAL CONNECTIONS

The level I mathematics curriculum should include the investigation of mathematical connections so that students can—

1. see mathematics as an integrated whole;
2. explore problems and describe results using graphical, numerical, physical, and verbal mathematical models or representations;
3. use a mathematical idea to further their understanding of other mathematical ideas;
4. apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, psychology, science, and business;
5. value the role of mathematics in our culture and society.

21

STANDARD 5: NUMBER AND NUMBER RELATIONSHIPS

The level I mathematics curriculum should include the continued development of number and number relationships so that students can—

1. understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, and scientific notation) in real-world and mathematical problem situations;
2. develop number sense for whole numbers, fractions, decimals, integers, and rational numbers;
3. understand and apply ratios, proportions, and percents in a wide variety of situations;
4. investigate relationships among fractions, decimals, and percents;
5. represent numerical relationships in one- and two-dimensional graphs (e.g., time vs quantity).

STANDARD 6: NUMBER AND NUMBER THEORY

The level I mathematics curriculum should include the study of number systems so that students can—

1. understand and appreciate the need for numbers beyond the whole numbers;
2. develop and use order relations for whole numbers, fractions, decimals, integers, and rational numbers;
3. extend their understanding of whole number operations to fractions, decimals, integers, and rational numbers;
4. understand how the basic arithmetic operations are related to one another. (Mth 20 only)

STANDARD 7: COMPUTATION AND ESTIMATION

The level I mathematics curriculum should develop the concepts underlying computation and estimation in various contexts so that students can—

1. compute with whole numbers, fractions, decimals, integers, and rational numbers;
2. develop, analyze, and explain procedures for computation and techniques for estimation;
3. develop, analyze, and explain methods for solving proportions;
4. select and use an appropriate method for computing from among mental arithmetic, paper and pencil, and the scientific calculator;
5. use computation, estimation, and proportions to solve problems;
6. use estimation to check the reasonableness of results.

STANDARD 8: PATTERNS AND RELATIONS

The level I mathematics curriculum should include explorations of patterns so that the students can—

1. describe, extend, analyze, and create a wide variety of patterns;
2. describe and represent relationships with tables, graphs, and rules;

STANDARD 9: ALGEBRA

The level I mathematics curriculum should include explorations of algebraic concepts and processes so that students can—

1. understand the concepts of variable, expression, and equation;
2. understand the concept of a formula.

STANDARD 10: STATISTICS

The level I mathematics curriculum should include exploration of statistics in real-world situations so that students can—

1. systematically collect, organize, and describe data;
2. construct, read, and interpret tables, charts, and graphs;
3. make informal inferences and arguments that are based on data analysis;
4. develop an appreciation for statistical methods.

STANDARD 11: PROBABILITY

The level I mathematics curriculum should include exploration of probability in real-world situations so that students can—

1. model situations by devising and carrying out experiments or simulations to determine probabilities;
2. model situations by constructing a sample space to determine probabilities;
3. appreciate the power of using a probability model by comparing experimental results with mathematical expectations;
4. make predictions that are based on experimental or theoretical probabilities;
5. develop an appreciation for the use of probability in the real world.

STANDARD 12: GEOMETRY/TRIGONOMETRY

The level I mathematics curriculum should include the study of the geometry of one, two, and three dimensions in a variety of situations so that students can—

1. identify, describe, compare, and classify geometric figures;
2. represent geometric figures with special attention to developing spatial sense;
3. represent and solve problems using geometric models;
4. understand and apply geometric properties and relationships;
5. develop an appreciation of geometry as a means of describing the physical world.

STANDARD 13: MEASUREMENT

The level I mathematics curriculum should include extensive concrete experiences using measurement so that students can—

1. develop their understanding of the process of measurement;
2. estimate, make, and use measurements to describe and compare phenomena;
3. select appropriate units and tools to measure to the degree of accuracy required in a particular situation;
4. understand the structure and use of systems of measurement;
5. develop their understanding of the concepts of perimeter, area, volume, angle measure, capacity, and weight and mass;
6. develop the concepts of rates and other derived and indirect measurements;
7. develop formulas and procedures for determining measures to solve problems.

INTERACTIVE MATHEMATICS II

This course assumes the Standards set forth in Level I

STANDARD 1: MATHEMATICS AS PROBLEM SOLVING

The level II mathematics curriculum should include the refinement and extension of methods of mathematical problem solving so that all students can-

1. use, with increasing confidence,problem-solving approaches to investigate and understand mathematical content;
2. apply integrated mathematical problem-solving strategies to solve problems from within and outside mathematics;
3. recognize and formulate problems from situations within and outside mathematics;
4. apply the process of mathematical modeling to real-world problem situations.

STANDARD 2: MATHEMATICS AS COMMUNICATION

The Level II mathematics curriculum should include the continued development of language and symbolism to communicate mathematical ideas so that all students can:

1. reflect upon and clarify their thinking about mathematical ideas and relationships;
2. formulate mathematical definitions and express generalizations discovered through investigations;
3. express mathematical ideas orally and in writing;
4. begin in to ask clarifying and extending questions related to mathematics they have read or heard about.

STANDARD 3: MATHEMATICS AS REASONING

The level II mathematics curriculum should include numerous and varied experiences that reinforce and extend logical reasoning skills so that all students can:

1. make and test conjectures;
2. follow logical arguments;

STANDARD 4: MATHEMATICAL CONNECTIONS

The level II mathematics curriculum should include the investigation of the connections and interplay among various mathematical topics and their application so that all students can:

1. recognize equivalent representations of the same concept;
2. relate procedures in one representation to procedures in an equivalent representation;
3. use and value the connections between mathematics and other disciplines.

STANDARD 5: ALGEBRA

The level II mathematics curriculum should include the continued study of algebraic concepts and methods so that all students can-

1. represent situations that involve variable quantities with expressions and equations;
2. use tables and graphs as tools to interpret expressions and equations;
3. operate on expressions, and solve linear equations, or a formula for a first degree variable.

STANDARD 6: FUNCTIONS/RELATIONS

The level II mathematics curriculum should include the continued study of relations so that all students can:

1. model real-world phenomena;
2. represent and analyze relationships using tables, verbal rules, equations, and graphs.

STANDARD 7: GEOMETRY FROM A SYNTHETIC PERSPECTIVE

The level II mathematics curriculum should develop include the continued study of the geometry of two and three dimensions so that all students can:

1. interpret and draw two and three-dimensional objects;
2. represent problem situations with geometric models and apply properties of figures;
3. classify figures in terms of and similarity and apply these relationships.

24

STANDARD 8: GEOMETRY FROM AN ALGEBRAIC PERSPECTIVE

(NA)

STANDARD 9: TRIGONOMETRY

The level II mathematics curriculum should include the study of trigonometry only to the extent that all students can understand angular measurement.

STANDARD 10: STATISTICS

The level II mathematics curriculum should include the continued study of data analysis and statistics so that all students can:

1. understand sampling and recognize its role in statistical claims.

STANDARD 11: PROBABILITY

The level II mathematics curriculum should include the continued study of probability so that all students can:

1. use experimental or theoretical probability, as appropriate, to represent and solve problems involving uncertainty;
2. use simulations to estimate probabilities;
3. understand the concept of a random variable;
4. create and interpret discrete probability distributions.

STANDARD 12: DISCRETE MATHEMATICS

The level II mathematics curriculum should include topics from discrete mathematics so that all students can: develop and analyze algorithms.

STANDARD 13: CONCEPTUAL UNDERPINNINGS OF CALCULUS

(NA)

STANDARD 14: MATHEMATICAL STRUCTURE

The level II mathematics curriculum should include the study of mathematical structure so that all students can:

1. compare and contrast the real number system and its various sub-systems with regard to their structural characteristics;
2. understand the logic of algebraic procedures.

INTERACTIVE MATHEMATICS III

This course assumes the Standards set forth in Level II

STANDARD 1: MATHEMATICS AS PROBLEM SOLVING

The level III mathematics curriculum should include the refinement and extension of methods of mathematical problem solving so that students can:

1. apply integrated mathematical problem-solving strategies to solve problems from within and outside mathematics;
2. recognize and formulate problems from situations within and outside mathematics;
3. apply the process of mathematical modeling to real-world problem situations.

STANDARD 2: MATHEMATICS AS COMMUNICATION

The level III mathematics curriculum should include the continued development of language and symbolism to communicate mathematical ideas so that all students can:

1. read written presentations of mathematics with understanding;
2. ask clarifying and extending questions related to mathematics they have read or heard about;
3. appreciate the economy, power, and elegance of mathematical notation and its role in the development of mathematical ideas.

STANDARD 3: MATHEMATICS AS REASONING

The level III mathematics curriculum should include numerous and varied experiences that reinforce and extend logical reasoning skills developed and Mth 70 and so that all students can:

1. formulate counter-examples.
2. construct simple valid arguments.

STANDARD 4: MATHEMATICAL CONNECTIONS

The level III mathematics curriculum should include the investigation of the connections and interplay among various mathematical topics and their application so that all students can:

1. use and value the connections among mathematical topics.

STANDARD 5: ALGEBRA

The level III mathematics curriculum should include the continued study of algebraic concepts and methods so that all students can:

1. represent situations that involve variable quantities with expressions, equations, and inequalities;
2. use tables and graphs as tools to interpret expressions, equations, and inequalities.

STANDARD 6: FUNCTIONS/RELATIONS

The level III mathematics curriculum should include the continued study of functions so that all students can:

1. model real-world phenomena with a variety of relations;
2. represent and analyze relationships using tables, verbal rules, equations, and graphs;
3. translate among tabular, symbolic, and graphical representations of relations;
4. recognize that a variety of problem situations can be modeled by the same type of relation;
5. analyze the effects of parameter changes on the graphs of relations.

STANDARD 7: GEOMETRY FROM A SYNTHETIC PERSPECTIVE

The level III mathematics curriculum should develop include the continued study of the geometry of two and three dimensions introduced in level III.

STANDARD 8: GEOMETRY FROM AN ALGEBRAIC PERSPECTIVE

The level III mathematics curriculum should include the study of the geometry of two and three dimensions from an algebraic point of view.

STANDARD 9: TRIGONOMETRY

The level III mathematics curriculum should include the study of trigonometry so that all students can—

1. apply trigonometry to problem situations involving triangles;
2. explore periodic real-world phenomena using the sine and cosine relations.

STANDARD 10: STATISTICS

The level III mathematics curriculum should include the continued study of data analyss and statistics so that all students can:

1. construct and draw informal inferences from charts, tables, and graphs that summarize data from real-world situations;
2. use linear curve fitting to predict from data;
3. understand and apply measures of central tendency, variability, and linear correlation;
4. design a statistical experiment to study a problem, conduct the experiment, and interpret and communicate the outcomes.

STANDARD 11: PROBABILITY

The level III mathematics curriculum should include the continued study of probability so that all students can:

1. describe, in general terms, the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.

STANDARD 12: DISCRETE MATHEMATICS

The level III mathematics curriculum should include topics from discrete mathematics so that all students can:

1. represent problem situations using discrete structures such as finite graphs, sequences, and recurrence relations
2. develop and analyze algorithms.

STANDARD 13: CONCEPTUAL UNDERPINNINGS OF CALCULUS

The level III mathematics curriculum should include the informal exploration of calculus from both a graphical and a numerical perspective so that all students can—

1. determine maximum and minimum points of a graph and interpret the results in problem situations.

STANDARD 14: MATHEMATICAL STRUCTURE

The level III mathematics curriculum should include the study of mathematical structure so that all students can

1. understand the logic of algebraic procedures;
2. appreciate that seemingly different mathematical systems may be essentially the same.
3. understanding the meaning of "i" and can add, subtract, multiply, and divide complex numbers;
4. introduce complex numbers.

INTERACTIVE MATHEMATICS IV

This course assumes the Standards set forth in Level III.

STANDARD 1: MATHEMATICS AS PROBLEM SOLVING
The level IV mathematics curriculum should include the refinement and extension of methods of mathematical problem solving developed in level III.

STANDARD 2: MATHEMATICS AS COMMUNICATION
The level IV mathematics curriculum should include the continued development of language and symbolism developed in level III to communicate mathematical ideas.

STANDARD 3: MATHEMATICS AS REASONING
The level IV mathematics curriculum should include numerous and varied experiences that reinforce and extend logical reasoning skills so that all students can:

1. follow logical arguments;
2. judge the validity of arguments;
3. construct simple proofs.

STANDARD 4: MATHEMATICAL CONNECTIONS
The level IV mathematics curriculum should include the investigation of the connections and interplay among various level IV mathematical topics and their application.

STANDARD 5: ALGEBRA
The level IV mathematics curriculum should include the continued study of algebraic concepts and methods so that all students can:

1. appreciate the power of mathematical abstraction and symbolism.

STANDARD 6: FUNCTIONS
The level IV mathematics curriculum should include the continued study of functions so that all students can:

1. model real-world phenomena with a variety of functions;
2. translate among tabular, symbolic, and graphical representations of functions;
3. recognize that a variety of problem situations can be modeled by the same type of function;
4. analyze the effects of parameter changes on the graphs of functions;
5. understand operations on, and the general properties and behavior of classes of functions.

STANDARD 7: GEOMETRY FROM A SYNTHETIC PERSPECTIVE
The level IV mathematics curriculum should include the continued study of the geometry of two and three dimensions.

STANDARD 8: GEOMETRY FROM AN ALGEBRAIC PERSPECTIVE
The level IV mathematics curriculum should include the study of the geometry of two and three dimensions from an algebraic point of view so that all students can:

1. translate between synthetic and coordinate representations;
2. deduce properties of figures using transformations and using coordinates;
3. identify congruent and similar figures using transformations;
4. analyze properties of Euclidean transformations and relate translations to vectors;
5. deduce properties of figures using vectors.

STANDARD 9: TRIGONOMETRY

The level IV mathematics curriculum should include the study of trigonometry so that all students can:

1. understand the connection between trigonometric and circular functions; (Mth 112 only)
2. use circular functions to model periodic real-world phenomena; (Mth 112 only)
3. apply general graphing techniques to trigonometric functions; (Mth 112)
4. solve trigonometric equations and verify trigonometric identities; (Mth 112)
5. understand the connections between trigonometric functions and polar coordinates, complex numbers, and series; (Mth 112)
6. apply transformations, coordinates, and vectors in problem solving. (Mth 112)

STANDARD 10: STATISTICS

The level IV mathematics curriculum should include the continued study of data analysis and statistics so that all students can:

1. use non-linear curve fitting to predict from data; (Mth 111)
2. understand and apply measures of central tendency, variability, and non-linear correlation. (Mth 111)

STANDARD 11: PROBABILITY

The level IV mathematics curriculum should include the continued study of probability.

STANDARD 12: DISCRETE MATHEMATICS

The level IV mathematics curriculum should include topics from discrete mathematics.

STANDARD 13: CONCEPTUAL UNDERPINNINGS OF CALCULUS

The level IV mathematics curriculum should include the informal exploration of calculus from both a graphical and a numerical perspective so that all students can:

1. determine maximum and minimum points of a graph and interpret the results in problem situations;
2. investigate limiting processes by examining infinite sequences and series;
3. analyze the graphs of polynomial, rational, radical, and transcendental functions. (Mth 111)

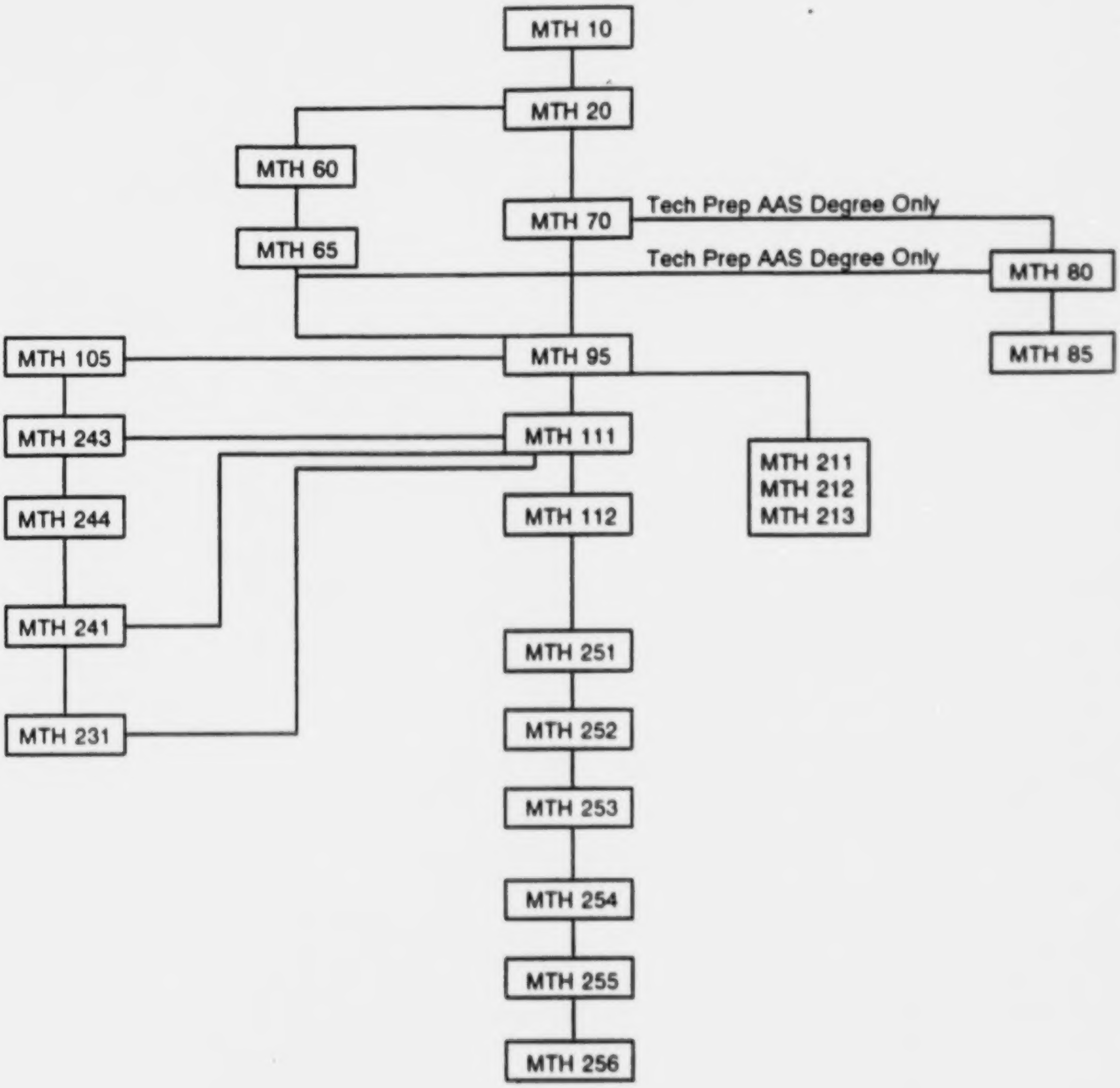
STANDARD 14: MATHEMATICAL STRUCTURE

The level IV mathematics curriculum should include the study of mathematical structure so that all students can:

1. develop the complex number system and demonstrate facility with its operations;
2. prove elementary theorems.

MHCC COLLEGE PREP/TECH PREP COURSE SEQUENCE

9/93


MTH 10
MTH 20
MTH 60
MTH 65
MTH 70
Tech Prep AAS Degree Only
Tech Prep AAS Degree Only
MTH 80
MTH 85
MTH 105
MTH 95
MTH 243
MTH 111
MTH 211
MTH 212
MTH 213
MTH 244
MTH 112
MTH 241
MTH 251
MTH 231
MTH 252
MTH 253
MTH 254
MTH 255
MTH 256

★ MTH 10	Interactive Mathematics IA
★ MTH 20	Interactive Mathematics IB
✓ MTH 60	Interactive Mathematics IIA
✓ MTH 65	Interactive Mathematics IIB
✓ MTH 70	Interactive Mathematics II
✓ MTH 80, 85	Technical Mathematics I, II
✓ MTH 95	Intermediate Algebra (Interactive Mathematics III)
♦ MTH 105	Introduction to Comtemporary Mathematics
✓ MTH 111	Pre-Calculus I: Elementary Functions
♦✓ MTH 112	Pre-Calculus II: Trigonometry & Analytical Geometry
★ • MTH 211, 212, 213	Fundamentals of Elementary Mathematics
♦ MTH 231	Discrete Mathematics
♦✓ MTH 241	Elementary Calculus
♦ • MTH 243	Introduction to Probability & Statistics I
♦ • MTH 244	Statistics II
♦ • MTH 251, 252, 253	Differential and Integral Calculus
♦ • MTH 254, 255	Vector Calculus I, II
♣ • MTH 256	Applied Differential Equations

KEY

- ★ Course requires at least a scientific calculator (TI-34 or TI-82 recommended)
- ♦ Computer lab included (fee required)
- ♣ Computer lab may be required
- ✓ Graphing calculator is required (TI-82 recommended)
- • Graphing calculator may be used

MT. HOOD COMMUNITY COLLEGE DISTRICT
Gresham, Oregon 97030

COURSE OUTLINE

Please check appropriate box:

/ / LOWER DIVISION COLLEGIATE

/ / OCCUPATIONAL PREPARATORY

/ / OCCUPATIONAL SUPPLEMENTARY

/ X / OTHER EDUCATION,INCLUDING GENERAL EDUC. AND ADULT

COURSE TITLE INTERACTIVE MATHEMATICS IA

DATE 12/91, 1/92, 1/93

COURSE NUMBER MTH 10

COURSE CREDIT 3

WEEKLY/TERM LECTURE HOURS 2 / 24

WEEKLY/TERM LAB HOURS 3 / 36

WEEKLY/TERM SEMINAR HOURS ______

PREPARED BY Mathematics Division

APPROVED BY Matthews
Immediate Supervisor

____
Dean

GRADED _____ OPTIONAL _______ S/U GRADED X NO GRADE ______

GENERAL EDUCATION CATEGORY: AA NO (Yes/No) AAS NO (Yes/No) AGS NO (Yes/No)

GUIDED STUDIES CODE 4

HEADCOUNT LOADING? ___ Yes X No ___ Factor

COURSE DESCRIPTION: This is an interactive mathematics course intended for students who desire to master the concepts of whole numbers, fractions or decimals. The emphasis of the course is on understanding concepts, estimation, simple measurement, language usage, and reasoning skills. Real world applications are used and the reasonableness of answers is stressed. Calculator use is taught for computation. A scientific calculator with a fraction key is required. Attendance is required the first five class meetings.

PREREQUISITES: Students must be either concurrently enrolled in RD 90 and WR 90, or place above those levels.

INSTRUCTIONAL MATERIALS REQUIRED OF STUDENT: (text, supplies, etc.)

Math 10 Packet
Scientific calculator

MT. HOOD COMMUNITY COLLEGE DISTRICT
Gresham, Oregon 97030

COURSE OUTLINE

Please check appropriate box:

/ / LOWER DIVISION COLLEGIATE
/ X / OCCUPATIONAL PREPARATORY
/ / OCCUPATIONAL SUPPLEMENTARY
/ / OTHER EDUCATION, INCLUDING GENERAL EDUC. AND ADULT

COURSE TITLE Interactive Mathematics IB
DATE 12/91, 1/92, 1/93, 7/93

COURSE NUMBER MTH 20
COURSE CREDIT 4

WEEKLY/TERM LECTURE HOURS 4 / (At least one 2-hr block)
WEEKLY/TERM LAB HOURS 2 /
WEEKLY/TERM SEMINAR HOURS At least 3 contact meetings

PREPARED BY Mathematics Division
APPROVED BY ____________
Immediate Supervisor

____
Dean

GRADED X OPTIONAL ______ S/U GRADED ______ NO GRADE ______

GENERAL EDUCATION CATEGORY: AA NO (Yes/No) AAS NO (Yes/No) AGS NO (Yes/No)

GUIDED STUDIES CODE 4
HEADCOUNT LOADING? ___ Yes X No ___ Factor

COURSE DESCRIPTION: This is an interactive mathematics course for both the technical prep and college prep student that emphasizes the use of mathematics as a language to heuristically model and analyze problems. It covers **data analysis**, pre-algebra and practical geometry **topics including** patterns and relationships; rational number operations and applications with the scientific calculator; significant digits, accuracy, estimating, approximating, scientific and engineering notation; applications with ratios, percents, proportions, measurement, unit conversions, the metric and English systems; formula evaluation, practical geometry, **elementary probability and elementary statistics**. A scientific calculator with a fraction key is required and its use is fully integrated in the course. **Students who miss class the first week may be dropped from the class.**

PREREQUISITE: RD 90 and MTH 10, or suitable performance on the mathematics placement exam

ISTRUCTIONAL MATERIALS REQUIRED OF STUDENT:

Text
Scientific Calculator

32

MT. HOOD COMMUNITY COLLEGE DISTRICT
Gresham, Oregon 97030

COURSE OUTLINE

Please check appropriate box:

/ / LOWER DIVISION COLLEGIATE	/ X / OCCUPATIONAL PREPARATORY
/ / OCCUPATIONAL SUPPLEMENTARY	/ / OTHER EDUCATION,INCLUDING GENERAL EDUC. AND ADULT

COURSE TITLE Interactive Mathematics II DATE 12/91, 1/92, 1/93, 7/93

COURSE NUMBER MTH 70 **(Treat as Mth 60 & Mth 65 in two 5 week blocks)** COURSE CREDIT 5

WEEKLY/TERM LECTURE HOURS **4 / (Two 2-hour blocks)** WEEKLY/TERM LAB HOURS **2 /** WEEKLY/TERM SEMINAR HOURS ______

PREPARED BY Mathematics Division APPROVED BY ____________
Immediate Supervisor

____
Dean

GRADED X OPTIONAL ______ S/U GRADED ______ NO GRADE ______

GENERAL EDUCATION CATEGORY: AA NO (Yes/No) AAS **NO** (Yes/No) AGS **NO** (Yes/No)

GUIDED STUDIES CODE 7 HEADCOUNT LOADING? ___ Yes X No ___ Factor

COURSE DESCRIPTION: This is interactive mathematics level II A and B combined in one course for both the college prep and technical prep student. A heuristic approach to problem solving and real world applications are emphasized. The topics covered include the real number system, **guidelines for approximate numbers, precision and accuracy,** integral exponents, unit conversions and dimensional analysis; simplifying and factoring algebraic expressions; solving modeling with linear and literal equations and formulas; practical geometry including angle measurement; the Cartesian plane, graphing linear relationships; **sample data analysis, and probability. A graphing calculator** is required and its use is fully integrated in the course. **Students who miss class the first week may be dropped from the course.**

PREREQUISITE: RD 90 and WR 90, MTH 20 with a C or better, or suitable performance on the mathematics placement exam.

INSTRUCTIONAL MATERIALS REQUIRED OF STUDENT:

Text, graphing calculator, **the TI-82 graphing calculator is recommended**

33

MT. HOOD COMMUNITY COLLEGE DISTRICT
Gresham, Oregon 97030

COURSE OUTLINE

Please check appropriate box:

/ / LOWER DIVISION COLLEGIATE
/ X / OCCUPATIONAL PREPARATORY
/ / OCCUPATIONAL SUPPLEMENTARY
/ / OTHER EDUCATION, INCLUDING GENERAL EDUC. AND ADULT

COURSE TITLE **Interactive Mathematics III (formerly Intermediate Algebra)**
DATE 9/90, 1/91, 1/92, 1/93, 8/93

COURSE NUMBER MTH 95
COURSE CREDIT 4 **(based on 4 lecture hours per week during 1993-94)**

WEEKLY/TERM LECTURE HOURS 4 /
WEEKLY/TERM LAB HOURS /
WEEKLY/TERM SEMINAR HOURS

PREPARED BY Mathematics Division
APPROVED BY
Immediate Supervisor

Dean

GRADED X
OPTIONAL
S/U GRADED
NO GRADE

GENERAL EDUCATION CATEGORY: AA NO (Yes/No) AAS YES (Yes/No) AGS YES (Yes/No)

GUIDED STUDIES CODE 7
HEADCOUNT LOADING? Yes X No Factor

COURSE DESCRIPTION: **A technology-based investigation into the connections and interplay among various mathematical topics. These topics include an introduction to the graphing calculator, absolute value equations and inequalities, complex numbers, quadratic and rational equations in one variable, linear equations and inequalities in two variables, systems of linear and quadratic equations in two variables, applied geometry, right triangle trigonometry, and introductory statistics. A heuristic approach to problem solving is emphasized with applications modeled from business and industry, economics, science, communications and other related disciplines. A graphing calculator is required. Attendance is required for the first week of class.**

PREREQUISITE: MTH 65 or MTH 70 with a C or better, or suitable performance on the mathematics placement exam.

INSTRUCTIONAL MATERIALS REQUIRED OF STUDENT:
.. Graph paper or engineering pad
2. Text
3. Graphing Calculator (TI-82 recommended)
4. 15 centimeter ruler

INTERACTIVE MATHEMATICS

LEVEL I-IV

DRAFT

Tolleson High School
9419 West Van Buren
Tolleson, Arizona 85353

Contact Person: Cathy Gardner
602/247-4222

.35

INTERACTIVE MATHEMATICS - LEVEL I

Upon completion of Interactive Mathematics - Level I, the student will be able to:

NUMBER SENSE

1. Translate between the word name and notational form of whole numbers, fractions, ratios, and decimals from the place values of trillions to hundred-thousands.
2. Locate points on a number line of real numbers in all forms and arrange them in order and use appropriate notation (< , >).
3. Demonstrate the understanding of the meaning of fractions, decimals, and percents by modeling these numbers in various ways and recognizing the numbers being modeled.
4. Demonstrate an understanding of the equivalency of fraction, decimal, and percentage representations of a number.
5. Use a calculator to convert among equivalent forms of fractions, decimals, and percents.
6. Determine the opposite (negative), the reciprocal, and the absolute value of a real number.
7. Understand that the calculator approximates irrational numbers.
8. Express numbers to required specificity (rounding, significant digits).
9. Experiment with number concepts and operations in real world application and problem-solving contexts.
10. Use and explain the four operations using whole numbers, integers, fractions, and decimals.
11. Demonstrate the ability to choose among the four operations in an application context.
12. Explain how the basic arithmetic operations are related to one another.
13. Use correctly the vocabulary associated with the operations of addition, subtraction, multiplication, division, and powers.
14. Demonstrate techniques for estimation.
15. Estimate the answer to a problem before calculating it to later determine the reasonableness of the result.
16. Use and explain methods to solve proportions.
17. Use proportions to solve problems.

18. Demonstrate the ability to use a calculator to do the four basic binary operations, to use the fraction key to convert improper fractions and mixed numbers, fractions and decimals, rational numbers and percents, to simplify fractions, and to calculator powers using the x^2 and y^x keys.

19. Rewrite numbers displayed in "scientific calculator notation" in their decimal form.

20. Determine the appropriate problem-solving method from among estimation, paper-and-pencil computation, calculator, and computer.

21. Identify terms and factors in numerical expressions.

22. Determine the value of a numerical expression involving two or more different operations on the reals using the calculator.

MEASUREMENT and GEOMETRY

23. Select the appropriate units and tools that will enable the student to accurately measure in a given situation area, volume, time, and length.

24. Demonstrate the use of estimation strategies and determine the appropriate degree of accuracy in a given situation (e.g. carpet, sunburn).

25. Construct squares, rectangles, triangles, and circles given the geometric properties, and develop formulas to solve problems.

26. Build a model and demonstrate the difference between perimeter, area, volume, angle measure, capacity, and weight and mass.

27. Recognize, identify, construct, and classify the common geometric shapes of square, rectangle, parallelogram, triangle, trapezoid, and circle.

28. Given a list of formulas, select the correct one(s), to find the perimeter, area, or volume of any of the common geometric shapes or composites of these shapes including parallelograms, circles, and triangles.

29. Identify straight, right, and perpendicular angles.

30. Measure and/or layout lengths and areas.

31. Measure and/or layout angles with a protractor.

32. Define a circle and its circumference, radius, and diameter.

33. Identify "heights" and "bases" of geometric figures.

34. Define equilateral, isosceles, and right triangles and use and recognize in problem situations.

7

36. Identify similar triangles and shapes in the context of a problem situation.

37. Use the property of similar triangles to solve basic problems.

38. Explain the effects transformations have on geometric models.

PATTERNS and RELATIONS

39. Demonstrate a willingness to play with and explore numbers and numerical patterns.

40. Given a series of words, objects, groups, etc., describe the relationships through the use of modeling.

41. Solve simple logic problems by organizing the given information and making correct inferences and deductions.

42. Construct the appropriate graph, including labels and scaling, for a given set of data.

43. Answer appropriate questions about given graphs and charts.

44. Analyze the mathematical/statistical error in misleading graphs and charts. (Explain why the graph or chart is misleading. Explain how it should have been created.)

PROBABILITY and STATISTICS

45. Perform a variety of experimental and/or modeled activities that will require the collection, organization, and description of measured data, including the mean, median, and mode.

46. Read and interpret tables, charts, and graphs when presented and be able to construct appropriate tables, charts, and graphs from presented data or data obtained experimentally.

47. Make informal inferences and predictions, such as interpolations and extrapolations, based on data analysis in the form of charts and graphs.

48. Simulate experiments that can not be performed directly, in order to determine probabilities, and make predictions.

49. Compare actual experimental results with theoretical mathematical expectations by using the probability model.

50. Utilize the Fundamental Counting Principle to establish a sample space.

ALGEBRA

51. Demonstrate understanding of the concepts of variable, constants, factors, terms, expressions, and equations.

52. Translate (both directions) between meaningful English and algebraic expressions using correct vocabulary and notation.

53. Model simple real world relationships with formulas, tables, graphs, or verbal rules and explore the interrelationship of these representations.

54. Evaluate a given formula and provide the following information:
    a. state the formula
    b. substitute numerical values and units into the formula
    c. estimate the answer
    d. use the calculator without writing intermediate steps to find the result
    e. express answer with units and number of significant digits in the context of the problem.

55. Solve simple linear equations using concrete and informal methods.

56. Analyze and solve real world problem situations using algebraic models, formulas, tables, and graphs; verbalize process used for solution.

57. Understand and apply ratios and proportions in a variety of real world situations.

58. Informally investigate inequalities and non-linear relationships.

INTERACTIVE MATHEMATICS - LEVEL II

Upon completion of Interactive Mathematics - Level II, the student will be able to:

ALGEBRA

Real Number Applications

59. Follow instructions regarding the layout of applied problems and communicate complete solutions via the problem layout.

60. Recognize natural numbers, integers, and rational numbers, and distinguish them from irrational numbers.

61. State answers to problem situations using the appropriate precision or accuracy.

62. Perform numerical calculations using scientific notation and convert between scientific and ordinary notation.

63. Demonstrate proficient use of the operations (including powers and roots), fraction, reciprocal, sign, notation conversions, error correction, and clear keys on the calculator.

Algebraic Expressions with Real Coefficients

64. Recognize and distinguish variables and constants in an algebraic model of a problem situation.

65. Recognize and distinguish factors and terms in algebraic expressions.

66. Recognize an algebraic expression and determine the number of terms it has.

67. Identify the numerical coefficient of any term in an algebraic expression.

68. Read an algebraic expression term by term.

69. Simplify algebraic expressions of the complexity used in real world applications with real coefficients including scientific notation using the commutative, associative, and distributive properties, and the properties of integer exponents.

70. Evaluate an algebraic expression with real coefficients using the calculator and indicate if the value is exact or approximate.

71. Demonstrate the use of mathematical symbols to translate an English phrase into an algebraic expression.

72. Multiply one- and two-term algebraic expressions using the distributive property (DO NOT USE THE WORDS POLYNOMIAL, BINOMIAL, ETC.).

73. Divide a multi-term algebraic expression by a one-term algebraic expression.

40

74. Factor out common factors in a multi-term algebraic expression.

75. Recognize and factor by pattern recognition $a^2 - b^2$, $a^2 - 2ab + b^2$, $a^2 + 2ab + b^2$.

76. Demonstrate the understanding and application of the properties of integer exponents.

Equations and Formulas

77. Define, identify and distinguish the linear equation and inequality in one variable.

78. Solve any linear equation with real coefficients graphically using the properties of the equality.

79. Solve any linear inequality with real coefficients graphically using the properties of an inequality.

80. Solve literal equations and formulas for a first-degree variable. The solving process should include monic factoring.

81. Determine whether a formula is linear in a specific variable.

82. Model and solve problem situations using linear, simple quadratic, and rational equations, and linear inequalities. (Algebraic methods of processing are not always necessary.)

83. Demonstrate an understanding of the relationship between the graphical, numerical, algebraic, and English language representation of a problem situation.

Matrices

84. Use matrices to organize and interpret information.

85. Interpret sums and products of matrices.

GEOMETRY FROM A SYNTHETIC PERSPECTIVE

86. Define, classify, and apply the relationships among the following two-dimensional objects: square, rectangle, parallelogram (rhombus), circle, triangle, trapezoid, and polygons (3-10 sides).

87. Define, classify, and apply the relationships among three-dimensional objects and calculate their surface area and volume: cube, prism, regular square pyramids, cylinder, cones, sphere, combined solids.

88. Determine unknown angles in geometric figures using the principles of opposite, alternate interior, corresponding, adjacent and perpendicular angles.

89. Apply the formulas $(n - 2)180$ and $[(n - 2)180] \div n$ to calculate the sum of the interior angles of a triangle and the measure of each interior angle of a regular polygon.

90. Convert between degrees, minutes, seconds, and decimal degree.

90. Convert between degrees, minutes, seconds, and decimal degree.

91. Use the properties of similar triangles to solve application problems.

92. Compare and contrast an illustration in a problem situation with the use of the tangent, secant, diameter, radius, and chord of a circle.

TRIGONOMETRY

93. Use and/or apply Pythagorean Theorem to model real world problem situations.

94. Demonstrate an understanding of the relationship between the tangent of an angle and the concept of a constant rate of change.

95. Understand the relationship between the sides and angles of a right triangle using the sine, cosine, and tangent ratios.

96. Model and solve real world problem situations using the sine, cosine, and tangent ratios.

PROBABILITY and STATISTICS

97. Form a variety of experimental and/or modeled activities that will require the collection, organization, sorting, and sequencing of measured data.

98. Present data in a variety of forms, including tables, matrices, frequency distribution, box and whisker graphs, stem and leaf plots, line graphs, circle graphs, box plots and percentiles.

99. Give a statistical description of data by using mean, median, mode, range, and standard deviation.

100. Predict and record the probability of simple events or experiments and draw conclusions or make interpretations.

101. Utilize a graphing utility and scatter plot to determine a fitted line for a given data set.

INTERACTIVE MATHEMATICS - LEVEL III

Upon completion of Interactive Mathematics - Level III, the student will be able to:

ALGEBRA

Functions

102. Define a function and its domain and range in a problem situation.

103. Construct a function rule of a problem situation from charts, tables, and graphs.

104. Sketch a constant function ($y = k$), absolute value function ($y = |k|$), step function, basic power ($y = n^x$), linear ($y = x$), quadratic ($y = x^2$), rational ($y = \frac{1}{x}$), exponential ($y = n^x$), log ($y = \log x$, $y = \ln x$), and recognize a model from each of these functions.

105. Construct any linear function from a data set, chart, graph, and a problem situation.

106. Graph any linear function with or without a graphing utility and be able to identify the coordinates of its x- and y-intercepts and its slope.

107. Interpret the meaning in the slope of a problem situation that has been modeled.

108. Model real world applications with a quadratic relation and interpret maximum, minimum, and zeros.

109. Recognize a quadratic relation in factored form.

110. Construct a quadratic relation given its graph and component parts (i.e., points, intercepts, axis of symmetry, maximum, minimum).

111. Model, solve, and graph quadratic inequality relations from a problem situation.

112. Identify quadratic and linear identities.

113. Solve graphically simple non-linear systems.

Matrices

114. Model situations that use the operations of matrices (i.e., sum and product).

115. Model and solve problem situations that result in linear systems.

GEOMETRY

116. Apply the distance and midpoint formulas to real world problem situations.

117. Use the formulas, plot point, and graph parallel and perpendicular lines.

118. Model equations of a line given a variety of situations including the graph of the line, two points on the line, slope of and point on the line.

119. Justify properties of quadrilaterals with respect to the coordinate plane.

120. Model inequalities in a coordinate plane for real world situations.

121. Apply the formulas to solve arc length, area of a sector, and area of a segment of a circle.

122. Model various transformations, such as reflections, translations, rotations of 90°, size transformations, and composites of transformations.

123. Prove informally in paragraph form, congruencies and similarities of triangles.

124. Demonstrate the use of ratios to solve perimeters, areas, and volumes of two- and three-dimensional geometric shapes and solids.

125. Define a vector and distinguish from a scalar in a problem situation.

126. Sketch a vector on a plane, given its component parts.

127. Perform vector operations both algebraically and geometrically in a problem situation

TRIGONOMETRY

128. Model and solve real world situations using right triangle trigonometry.

129. Model and solve real world situations using the law of sines and the law of cosines.

130. Use triangle trigonometry to demonstrate an understanding of the sine, cosine, and tangent relationships and the unit circle (quadrants I and II).

PROBABILITY and STATISTICS

131. Demonstrate the procedure of correct polling, surveying, and sampling.

132. Formulate appropriate questions and criteria to conduct surveys.

133. Collect and organize data based on those questions

134. Analyze data using graphs, tables, and frequency distributions, and make conjectures and draw conclusions based on that data.

135. Effectively communicate the results and conclusions of a survey or poll.

136. Take formal interpolations and extrapolations from a regression like for a given data set

Rational Exponents

137. Convert between the radical form and the exponential form of an expression.

138. Model and solve problem situations that result in radical expressions or equations and expressions or equations that contain rational exponents. (An algebraic process is not always necessary.)

139. Solve quadratic, absolute value, and rational inequalities by graphing and recognize their applications in a problem situation.

140. Define an interval using absolute value and inequality notation.

141. Model and solve problem situations that result in logarithmic and exponential relations.

INTERACTIVE MATHEMATICS - LEVEL IV

Upon completion of Interactive Mathematics - Level IV, the student will be able to:

ALGEBRA

142. Distinguish between polynomial, rational, radical, and transcendental functions and equations, and define their domains and ranges.

143. Model and solve problem situations from the above functions and equations.

144. Determine graphically the maximum and minimum points of polynomial functions and interpret their results in problem situations.

145. Represent problem situations using discrete structures such as finite graphs, sequences, and recursive relations.

146. Demonstrate the usefulness of the properties of common and natural logarithms in problem situations.

147. Define and identify increasing, decreasing, periodic, odd, even, one-to-one, continuous, and discontinuous functions with the aid of a graphing calculator.

148. Define and determine composite and inverse functions and applications of algebra functions [$(f+g)(x)$, $(f-g)(x)$, $f(g(x))$, $f(x)/g(x)$, $[f(x)][g(x)]$].

149. Translate between tabular, symbolic, and graphical representations of functions.

GEOMETRY

150. Model the intersection of a plane with a cone to show the origin of each of the four conic sections.

151. Plot points in an (x, y, z) coordinate system.

152. Graph each of the four conic sections.

153. Write the equations of the graph of a conic sections.

154. Sketch an approximate graph of a conic section given a minimum amount of information (i.e., center, radius, foci, directrix, etc.).

155. Solve real world problems graphically using conic sections.

156. Predict the effect on the graph of changes made to a conic equation.

TRIGONOMETRY

157. Derive and graph the six trigonometric functions from the circular functions.

158. Derive trigonometric identities (Pythagorean, ratio, reciprocal) and apply them in real world situations.

40

159. Demonstrate an understanding of inverse relations between the six trigonometric functions.

160. Use a graphing utility (calculator) to sketch any graph of the form $y = a + b \sin(cx + d)$ or its equivalent.

161. Model and solve real world applications using trigonometric equations.

162. Using the graphing utility, convert between the rectangular coordinate system and the polar coordinate system.

163. Sketch the graph of any trigonometric function or its inverse using the aid of a graphing calculator, scaling the horizontal axis using the radian measure of the angle.

164. Determine amplitude, period, phase shift, frequency, and zeros of any trigonometric function.

165. Model and solve real world situations using vectors and vector operations, both graphically and algebraic.

166. Use a graphing utility to graph a curve defined parametrically.

167. Describe a graph using rectangular, polar, or parametric equations.

168. Demonstrate an understanding of the complex number system and real world applications of it.

PROBABILITY and STATISTICS

169. roduce, given a set of data, a scatter plot, and the equation of a fitted polynomial for the data.

170. Interpolate and extrapolate data from a given regression equation.

171. Use permutations and combinations to count the number of possible outcomes to an event.

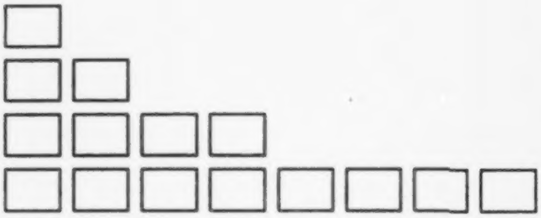
172. Identify and recognize a sampling space that is described by the normal distribution

173. Complete a comprehensive survey project working in cooperative groups which will include the following components:
    1. Identification of original problem or question
    2. Definition of the problem in clear, specific terms
    3. Development of hypothesis
    4. Collection of existing research
    5. Design of techniques to collect pertinent data
    6. Collections of data
    7. Analysis of data
    8. Interpretation of data
    9. Writing of results

LEARNING STLYES

PATTERNS: 1, 2, 4, 8, ...

VISUAL:



SYMBOLS: $a_n = 2^{n-1}, n \varepsilon \mathbf{N}$

COMMUNICATION: A sequence of whole numbers where the first number is one, and the next number results from multiplying the previous number by 2.

LANGUAGE TRANSLATIONS
(Descriptive Processing)

When students are learning mathematics, they may go through as many as four levels of language translations:

Level 1	**Incomplete verbalizations in their native language**
Level 2	**Articulate responses in their native language**
Level 3	**Articulate responses using mathematical terminology**
Level 4	**Articulate responses using mathematical symbols**

EXAMPLE	Question: What are these? → 1, 3, 9, 27...
Level 1	Numbers
Level 2	They are powers of three.
Level 3	It is a sequence of numbers that are the powers of three.
Level 4	$a_n = 3^{n-1}$, where n is any natural numbers.

Descriptive Processing should be distinguished from
REASONING SKILLS, DEMONSTRATING THE ABILITY:

- TO THINK LOGICALLY
- TO ORGANIZE DATA
- TO INTEGRATE CONCEPTS
- TO MAKE CHOICES
- TO MAKE DECISIONS
- TO DETERMINE REASONABILITY

P. E. Matthews 9/89

LANGUAGE PARALLELS

English	Mathematics
Word	Term
Phrase	Expression
Declarative Statement	Relation (for example, the equation or inequality)

English Example:

"The person with the brown hair in the third seat in the front row is going *to the Capitol of the United States."*

Said more simply without changing the meaning or determining the truth of the sentence:

"Mary is going *to Washington, D.C."*

Arithmetic Example:

$$6 + \frac{15}{5} - 4 = 2(3 + 10) - 21$$

$$6 + 3 - 4 = 2(13) - 21$$

$$5 = 5$$

P. E. Matthews 9/89

STEP BY STEP PROCESS

STEPS:

1. Select any positive whole number
2. Double it, then add 9
3. Add your original number to your result
4. Divide by 3
5. Add 7 to your quotient
6. Subtract your original number from the sum

USING A MATHEMATICAL EXPRESSION TO MODEL THE PROCESS:

Let x represent any positive whole number.

$$\frac{2x + 9 + x}{3} + 7 - x =$$

$$\frac{3x + 9}{3} + 7 - x =$$

$$x + 3 + 7 - x =$$

$$10$$

The result is always 10!

P. E. Matthews 9/89

51

GRAPHING CALCULATOR ACTIVITIES

1. Wind combined with cold makes temperature feel colder. *Windchill* is the still-air temperature that would have the same cooling effect on human skin as a given combination of temperature and wind speed. We can use linear equations to help us generate a windchill chart that can be used for quick reference.

   The equations below were derived from wind and temperature data. The y variable represents the windchill and the x variable represents the temperature in degrees Fahrenheit. There is a separate equation for each wind speed. The numbers in each equation are constants for that wind speed.

Wind Speed	Linear Function
5 mph	$y_1 = 1.1x - 4.6$
10 mph	$y_2 = 1.2x - 21$
20 mph	$y_3 = 1.4x - 38$
30 mph	$y_4 = 1.5x - 48.5$
40 mph	$y_5 = 1.6x - 52.5$

   Graph the equations and create a windchill chart.

Suggested Range	
Xmin = -35	Ymin = -130
Xmax = 30	Ymax = 30
Xscl = 5	Yscl = 10

Windchill (in equivalent °F.)

Wind Speed (mph)	Actual Thermometer Reading (°F)													
	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35
5														
10														
20														
30														
40														

2. How many times must you tear a piece of paper (and the pieces created) in half to create a pile of paper (each piece of paper lying flat) as high as a 13 year old boy is tall?

3. A boss announced to the employees that everyone has to take a 20% cut in pay this year because sales are down. He also reassured the employees that he expects sales to increase next year and everyone will receive a 20% raise. **Give concrete reasons why an employee should or should not worry about his/her salary over the next two years. Provide examples.**

ANSWER

2. PAPER TEARING PROBLEM

Number of Tears	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Number of Pieces of Paper	1	2	4	8	16	32	64	128	256	512	1024	2,048	4,096	8,192	16,384
	2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^7	2^8	2^9	2^{10}	2^{11}	2^{12}	2^{13}	2^{14}
Height of the Pile in Inches	.004	.008	.016	.032	.064	.128	.256	.512	1.024	2.048	4.096	8.192	16.384	32.768	65.536

b. Describe the problem solving process.

The height of the pile is equal to the thickness of each piece of paper times the number of pieces of paper in the pile.

The number of pieces of paper I have after each tear is equal to 2 raised to "the number of tears."

The thickness of a piece of paper is .004 inches.

c. Create a mathematical model of the problem situation.

Let t = number of tears

Let h = height of the pile

$h = .004(2^t)$

d. Give a graphical representation of the problem.

ANSWER

3. **Let's look at the salary of six employess: a,b,c,d,e, and f.**

	a	b	c	d	e	f	
Original Salary **Salary 1st year**	$4,856	12,372	12,372	14,595	14,595	16,000	
Salary after the 20% cut **Salary 2nd year or after the 1st year**	$3,884.80	9,897.50	9,897.50	11,676	11,676	12,800	
Salary after the 20% raise **Salary the 3rd year or after the 2nd year**	$4,661.76	11,877	11,877	14,011.20	14,011.20	15,360	
Original salary minus salary after two years	$194.24	495	495	583.80	583.80	640	$2991.84

Model the problem situation algebraically.

Salary after the first year, y_1, equal 100% - 20% or 80% of the original salary, x.

$$y_1 = (100\% - 20\%)x$$
$$y_1 = (1 - .2)x$$
$$y_1 = .8x$$

Let y_2 = salary after the 2nd year

$$y_2 = y_1 + .2y_1$$
$$y_2 = .8x + .2(.8x)$$
$$y_2 = .8x + .16x$$
$$y_2 = .96x$$

This means after a 20% cut in salary, followed by a 20% raise, a salary after the 2nd year is only 96% of the original salary.

Model the problem situation graphically.

Set $y_1 = .8x$

$y_2 = .96x$

Possible Range

x min = 1000
x max = 20,000
x scl = 1
y min = 500
y max = 20,000

Trace along y_1 for the salary amount after the 20% cut, and along y_2 for the salary amount after the 20% increase.

A generalization the problem situation:

Let a = % of cut/raise written as a decimal. We know $a < 1$

$$y = (1 - a)x + a(1 - a)x$$
$$y = x - ax + ax - a^2x$$
$$y = 1x - a^2x$$
$$y = (1 - a^2)x$$

4. Students are given sheets of paper 30 cm by 20 cm to construct models (by cutting squares from each corner) of open rectangular containers that can hold:

   a. *at least a liter of water*

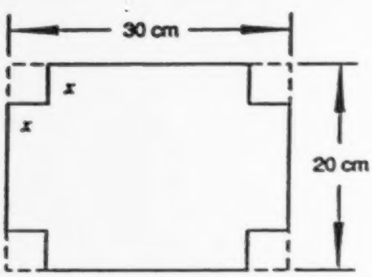
   b. *between 1025 and 1040 plastic blocks, each 1 cm^3*

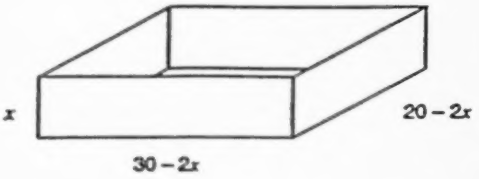
   c. *as much sand as possible*

   d. *at least 1/2 liter of milk but no more than 3/4 of a liter.*

Only one piece of paper can be used for each model. The only tools available to construct the models are a graphing calculator, a meter stick, scissors, tape, and all the paper needed to complete the project.

Discuss what size container is a reasonable solution to each of the problem situations. What mathematical concepts or ideas are needed to complete this activity?





Size of the cut (cm)	Length (cm)	Width (cm)	Height (cm)	Volume (cm^3)
x	$(30 - 2x)$	$(20 - 2x)$	x	$V = (30 - 2x)(20 - 2x)x$

5. A manufacturing company produces cordless phone systems. Each system sells for \$149.95 and costs \$110.50 to produce. The fixed overhead cost for the company is \$120,000 per year.

   a. *Create an algebraic model that represents the total yearly cost of producing the systems.*

   b. *Create an algebraic model that represents the total yearly revenue collected from selling x systems.*

   c. *Create an algebraic model that represents the profit earned in one year on this product.*

   d. *Determine the number of systems the company must sell in one year to break even.*

   e. *Determine the number of systems the company must sell to make a yearly profit of at least \$200,000.*

56

ANSWER

5. a. *Algebraic model that represents the total cost, y_1, of producing* **x** *systems in one year*:

$$y_1 = 110.50x + 120{,}000$$

b. *Algebraic model that represents the total revenue, y_2, collected from selling* **x** *systems in one year*:

$$y_2 = 149.50x$$

c. *Algebraic model of profit, y_3, in one year:* $y_3 = y_2 - y_1$

d. *To break even:* Set $y_1 = y_2$ or $y_3 = 0$ and determine x.

Possible Range :
x min = 0
x max = 5000 (profit per system approx. $40, 120,000/40 = 3000)
x scl = 500
y min = 0
y max = 1,000,000

Use a graphing calculator to graph y_1 and y_2 and determine point of intersection.

ANSWER: 3077 systems must sell to break even.

Store 3077 → x to algebraically confirm the result obtained from the graph:

Select y_1 and y_2 in y-VARS to evaluate each function at x.

You get: 460008.50 for y_1
460011.50 for y_2
OR
graph $y_3 = y_2 - y_1$ (Trace along graph until y = 0)

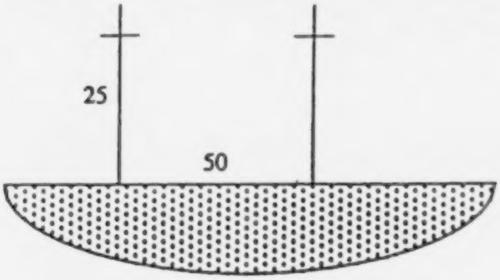
Possible Range :
x min = 0
x max = 5000
x scl = 500
y min = -100,000
y max = 100,000

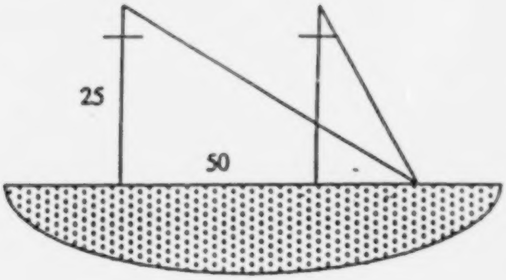
e. *To make at least $200,000 in profits*: (Trace along graph until $y_3 \rightarrow$ $200,000)

Possible Range :
x min = 5000
x max = 10,000
x scl = 500
y min = 100,000
y max = 300,000

ANSWER: 8210 systems must sell to make at least $200,000 in profit.

6. A sailboat has two 25 foot masts spaced 50 feet apart. If the two ends of a 100 foot rope is attached to the top of each mast, and stretched out, where can it be tacked down on the ship?

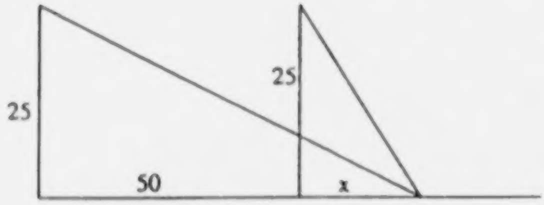




Solution and Discussion

Objective: The purpose of this problem is to demonstrate that the solution to a complicated radical equation can be easily found by graphing. The interpretation is not quite as easy, however.

1. Each mast and piece of rope form a right triangle. Since the rope is 100 feet long, create an expression that is equal to 100 feet.



The hypotenuse of each triangle can be represented as:

$$\sqrt{(x+50)^2+25^2} \qquad \text{and} \qquad \sqrt{x^2+25^2}$$

The length of the rope is the sum of the hypotenuses:

$$100 = \sqrt{(x+50)^2+25^2} + \sqrt{x^2+25^2}$$

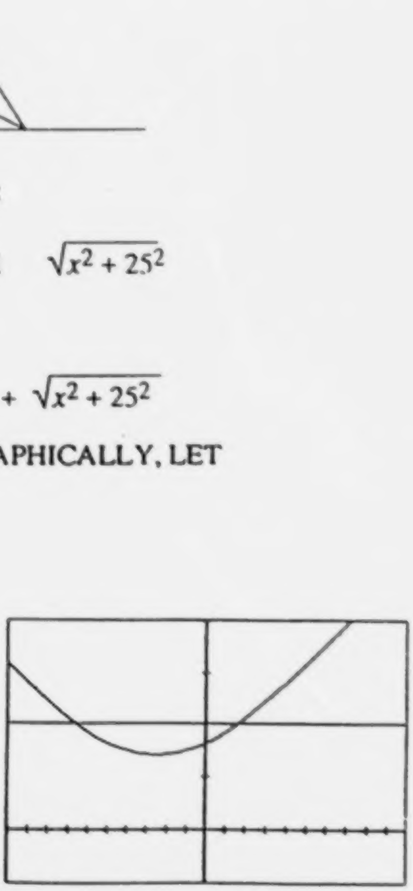
DO NOT SOLVE ALGEBRAICALLY. SOLVE GRAPHICALLY, LET

$Y1 = \sqrt{(x+50)^2+25^2} + \sqrt{x^2+25^2}$

$Y2 = 100$

$x \overset{\approx}{\neq} 15.9$ feet or $x = -65.9$ feet

Interpret these solutions from the graph.



x is the distance from the right mast. Assume the mast to have 0 distance. To the right would be + to the left negative. Therefore, the rope could be attached 15.9 feet from the right mast or 65.9 feet to the left of that mast.

PROBLEMS 7, 8, and 9 are taken from CORD Applied Mathematics

7. You are told that a long distance telephone call to "fax" (that is, electronically transmit a facsimile of) a document to your overseas branch office in Paris, France, costs $1.94 for the first minute, and $1.09 per minute there after, plus a 3% tax on the total charges. On the other hand, a 2-day delivery can be made for $22.

   a. Write a formula that can be used to compute the total cost of a phone call of *n* minutes. Be sure to define your variables. What would a 10-minute phone call cost?

   b. Rewrite the formula, isolating the total length of the call, *n*.

   c. Use this las formula to determine how long a phone call could be, to match the cost of the 2-day delivery of the document. How can you interpret this value for *n*?

8. Al and Cindy are trying to reduce their total utility costs. They first want to know what their utilities are costing them now. Their monthly bills are paid to the city garbage department. They have collected and organized the data shown below.

Month	Electric	Gas	Water/sewer	Garbage
1	$ 92.89	$89.00	$28.47	$7.50
2	105.89	68.92	33.96	7.50
3	121.52	54.84	35.80	7.50
4	135.49	43.20	40.87	7.50
5	139.61	29.12	44.26	7.50
6	141.94	22.11	46.46	7.50
7	140.33	26.95	44.11	7.50
8	140.52	23.11	43.20	7.50
9	137.45	27.19	41.88	7.50
10	129.16	37.54	35.56	7.50
11	118.36	48.79	36.76	7.50
12	105.61	62.59	32.11	7.50

   a. Find the average monthly utility costs for each type of utility. (The average monthly cost is the total cost per year divided by 12.)

   b. Some electric utilities offer an "averaging plan." With this plan, your bill each month is the average of the previous 12 month (including the current month). If All and Cindy chose this plan, what would their electric bill require them to pay for the 12th month?

   c. If their average electric bill is reduced by one third, how much can Al and Cindy hope to save during a month? During a year?

9. Mark and Marie are shopping for carpeting for their living room that measures 14 feet by 16 feet. They are trying to decide between two choices: 1) an area rug that is 12 feet by 15 feet and sells for $595, and 2) wall-to-wall carpet in a similar color and design that sells for $26.50 per square yard installed. (Note: Carpet comes in rolls that are 12 feet wide.) Which floor covering would cost less?

ANSWER TO 7.

a. The total cost of the phone call can be expressed as

$$T = 1.94 + 1.09\,(n-1) + 0.03\,[\,1.94 + 1.09\,(n-1)]$$

or,

$$T = 1.03\,[\,1.94 + 1.09\,(n-1)]$$

where T is the total dollar cost of a phone call to Paris, France, and
n is the number of minutes duration of the phone call (greater than 1 minute).

For a 10-minute call, $n = 10$.

$$T = 1.03\,[\,1.94 + 1.09\,(10-1)\,]$$
$$T = 12.10 \text{ (rounded)}$$

So, a 10-minute call to your Paris office would cost $12.10.

b. To isolate n (using the second form of the equation), first divide both sides by 1.03.

$$\frac{T}{1.03} = \frac{1.03\,[1.94 + 1.09\,(n-1)]}{1.03}$$

Then subtract 1.94 from both sides

$$\frac{T}{1.03} - 1.94 = 1.94 + 1.09\,(n-1) - 1.94$$

Divide both sides by 1.09.

$$\left(\frac{T}{1.03} - 1.94\right) \div 1.09 = \frac{1.09\,(n-1)}{1.09}$$

And finally add 1 to both sides.

$$\left[\left(\frac{T}{1.03} - 1.94\right) \div 1.09\right] + 1 = n - 1 + 1$$

Giving

$$n = \left[\left(\frac{T}{1.03} - 1.94\right) \div 1.09\right] + 1$$

So, for a total cost of $22, $T = 22$...

$$n = \left[\left(\frac{22}{1.03} - 1.94\right) \div 1.09\right] + 1$$

$$n = 19 \text{ min (rounded)}$$

This can be interpreted to mean that a 19-minute "fax" can be made for about the cost of a 2-day delivery of the document to the overseas office, and it will be there immediately!

ANSWER TO 8.

The student should see how the organization chosen (i.e., table) makes the interpretation easier.

a. The average monthly utility cost is calculated by dividing the total cost for the year by the number of months (i.e., 12).

	Annual Total	# of Months	Monthly Average
Electric	$1508.77	12	$125.73
Gas	533.36	12	44.45
Water/Sewer	463.44	12	38.62
Garbage	90.00	12	7.50

b. By the "average plan" Al and Cindy would pay the average of the previous 11 months and the current month. This is simply the average calculated above: $125.73.

c. Since Al and Cindy's average monthly electric bill was found to be $125.73, one third of their bill is

$$\$125.73 \div 3 = \$41.91$$

Hence, they could save (on the average) $41.91 per month by reducing their average monthly electric bill by one third. Over a year's time, this would amount to

12 x $41.91 = $502.92 saved annually

61

ANSWER TO 9.

Understand the problem

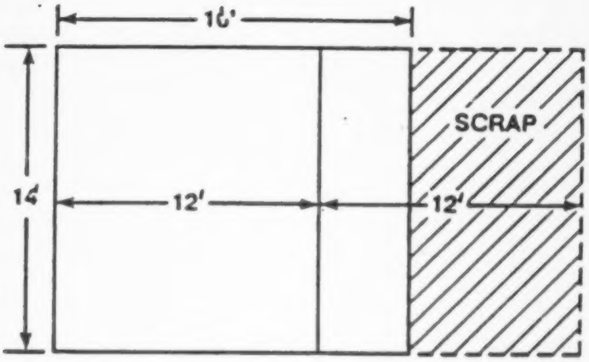
What is given?
- Living room floor measures 14' X 16'.
- Choice 1: area rug costs $595, measures 12' X 15'.
- Choice 2: wall-to-wall carpet costs $26.50 per square yard (installed).
- Carpet is sold in rolls that are 12' wide.

What is to be found?

Which choice would cost less?

Develop a plan
1. To determine the cost of Choice 2, find out how much carpet will be needed to cover the floor. Make a sketch to see how to lay out the 12-foot width.
2. Compute how many total feet of carpet would need to be purchased (including scrap).
3. Covert the feet measurements to yards.
4. Compute the number of square yards of carpet to e purchased.
5. Compute the cost of the carpet by multiplying the cost per square yard by the number of square yards needed.
6. Compare the carpet cost to the rug's cost to determine which choice costs less.

Carry out the plan
1. A sketch of the 14' X 16' living room might appear as shown below. Since the carpet is sold in 12'-wide rolls, there will be a considerable amount of scrap. The scrap can be minimized by selecting the alignment shown.



2. Using the layout shown, the first and second widths of carpet would extend 14' across the room. The second width would result in 8' X 14' of scrap carpet (that might be used in some other small room of the house).
   Total length of carpet = Length of first width + Length of second width
   Total length of carpet = 14' + 14'
   Total length of carpet = 28' (width is standard 12' roll)
3. Yards of carpet = Feet of carpet X Number of yards per foot
   Yards of carpet (length) = 28' X 1/3 yard per foot
   Yards of carpet (length) = 9.33 yards (rounded)
   Yards of carpet (width) = 12' X 1/3 yard per foot
   Yards of carpet (width) = 4 yards
4. Square yards of carpet = Length X Width
   Square yards of carpet = 9.33 yards X 4 yards
   Square yards of carpet = 37.32 square yards
5. Cost of carpet = Cost per square yard X Number of square yards
   Cost of carpet = $26.50 per square yard X 37.32 square yards
   Cost of carpet = $988.98
6. Compare: Cost of carpet vs. Cost of area rug
   Carpet cost ($988.98) > Area rug cost ($595)

So, the less expensive method would be the area rug.

References

Motivation to Change—Why Change is Necessary

National Research Council. *A Challenge of Numbers.* 2101 Constitution Avenue, NW, Washington, DC 20418: National Academy Press, 1990.

National Research Council. *Counting on You.* 818 Connecticut Avenue, NW, Suite 500, Washington, DC 20006: Mathematical Sciences Education Board, 1991.

National Research Council. *Everybody Counts: A Report on the Future of Mathematics Education.* 2101 Constitution Avenue, NW, Washington, DC 20418: National Academy Press, 1989.

National Research Council. *Moving Beyond Myths: Revitalizing Undergraduate Mathematics.* 2101 Constitution Avenue, NW, Washington, DC 20418: National Academy Press, 1991.

Standards for Change

National Council of Teachers of Mathematics. *Curriculum and Evaluation Standards for School Mathematics.* 1906 Association Drive, Reston, VA 22091: NCTM, 1989.

National Council of Teachers of Mathematics. *Professional Standards for Teaching Mathematics.* 1906 Association Drive, Reston VA 22091: NCTM, 1991.

Necessary Components of Change

United States, Department of Labor, Secretary's Commission on Achieving Necessary Skills (SCANS). *Learning a Living: A Blueprint for High Performance*, 1992.

United States, Department of Labor, SCANS. *What Work Requires of Schools*, 1991.

United States, Department of Labor, SCANS, *Blueprint for Action: Building Community Coalitions*, 1992.

United States, Department of Labor, SCANS, *Teaching the SCANS Competencies*, 1993.

Resource Materials and Course Text Materials

Carlson, R.J., Winter, M.J. *Algebra Experiments II, Exploring Non-linear Functions.* Addison-Wesley, 1993

Center for Occupational Research & Development (CORD). *Applied Mathematics.* 601 C Lake Air Drive, Waco, Texas 76710: The Center for Occupational Research and Development, 1990.

Charles, R.I., Martin, P., & Seldomrigele, G.A. *Problem-Solving Experiences in Algebra.* Addison-Wesley, 1991.

Charles, R.I., Martin, P., & Seldomrigele, G.A. *Problem-Solving Experiences in General Mathematics.* Addison-Wesley, 1991.

Charles, R.I., Martin, P., & Seldomrigele, G.A. *Problem-Solving Experiences in Geometry.* Addison-Wesley, 1991.

CORD. *Resource Book for the Implementation of Applied Mathematics.* 601 C Lake Air Drive, Waco, Texas 76710: The Center for Occupational Research and Development, 1989.

Davis, M.J., Moran, J.F., and Murphy, M.E. *Precalculus in Context, Functioning in the Real World.* PWS-Kent Publishing Co., Boston, 1993.

Interactive Mathematics Project. Project director: Diane Resek, Mathematics Department, San Francisco State University, San Francisco, CA 94132, (415) 338-2071.

Kysch, Judy. *Change from Within: College Preparatory Mathematics.* University of California at Davis, CRESS Center, (916)752-8393.

Lund, C., Anderson, E. *Graphing Calculator Activities, Exploring Topics in Algebra I and Algebra II.* Addison-Wesley, 1992.

Math and the Mind's Eye (7 units). The Math Learning Center, PO Box 3226, Salem OR 97302. (Grades 4 and 5)

Multiculturalism in Mathematics, Science, and Technology: Readings & Activities. Menlo Park, CA: Addison-Wesley, 1993.

National Council of Teachers of Mathematics. *The Addenda Series (15 vol.).* 1906 Association Drive, Reston VA 22091-1593: NCTM, 1992.

National Council of Teachers of Mathematics. *Assessment Mathematics, Myths, Models, Good Questions, and Practical Suggestions.* 1906 Association Drive, Reston, VA 22091: NCTM, 1991.

National Council of Teachers of Mathematics. *Calculators in Mathematics Education, 1992 Yearbook.* 1906 Association Drive, Reston, VA 22091: NCTM, 1992.

National Council of Teachers of Mathematics. *Data Analysis, New Topics for Secondary School Mathematics.* 1906 Association Drive, Reston, VA 22091: NCTM, 1988.

National Council of Teachers of Mathematics. *Mathematical Modeling in the Secondary School Curriculum.* 1906 Association Drive, Reston, VA 22091: NCTM, 1991.

Posamentier, A.S., Sheridan, G. *Math Motivators! Investigations in Algebra.* Menlo Park, CA: Addison-Wesley, 1983.

Posamentier, A.S., Sheridan, G. *Math Motivators! Investigations in Geometry.* Menlo Park, CA: Addison-Wesley, 1982.

Posamentier, A.S., Sheridan, G. *Math Motivators! Investigations in Pre-Algebra.* Menlo Park, CA: Addison-Wesley, 1982.

Stenmark, Thompson, & Cossey. *Family Math.* PO Box 3226, Salem, OR 97302.

The University of Chicago School Mathematics Project. *Transition Mathematics.* 1900 East Lake Avenue, Glenview, IL 60025: Scott Foresman and Company, 1990.

Visual Mathematics (2 vol.). The Math Learning Center, PO Box 3226, Salem OR 97302.

A Prospectus

for a Multimedia Curriculum in

Workplace Economics

Prepared by the Agency for Instructional Technology
in collaboration with the National Council on Economic Education

Instructional Designer
Richard P. Lookatch, Ph.D., AIT

Consultant
DeVon Yoho, Ph.D., Ball State University

February 1994

Reprinted with permission from
AIT

Please call John Nelson at
1-800-457-4509
for further information.

The Agency for Instructional Technology is a nonprofit U.S.-Canadian organization established in 1962 to strengthen education. AIT provides leadership and service to the education community through cooperative development, acquisition, and distribution of technology-based instructional materials. The Agency's headquarters is in Bloomington, Indiana.

The National Council on Economic Education, founded in 1949 as the Joint Council, is a nonprofit partnership of education, business, and labor dedicated to improving economic literacy. Through its affiliated network of state councils and 260 university centers, the National Council is the premier source of teacher training, educational materials, and curriculum reform in economics.

Cover design: Bill Dillon
Printing: Western Sun Printing Company

Contents

Overview 1

Rationale and Need 2

Course Design 4

  Project Topics 4

  Project Goals 4

  Competencies 4

  Project Characteristics 4

  Instructional Approach 5

  Course and Lesson Organization 6

  Student Materials 7

  Teacher Support and Training 8

  Curriculum Integration: Economics and Civics Symbiosis 10

Deliverables and Components 11

Operational Aspects 12

  Project Management 12

  Development of Materials 12

  Cooperative Development Process 12

  Consortium Meeting 13

  Evaluation 13

  Deliverables and Rights 13

  Schedule 14

  Budget 14

References 16

Appendix A: Five Competencies 17

Appendix B: Content of Modules 18

Overview

Educators and employers alike are hailing Tech Prep and the national movement toward applied academics as a critical new link between rigorous academics for all students and a highly trained, resourceful work force that is prepared for the challenges of the future. The Agency for Instructional Technology (AIT) has been a leader in providing schools with curriculum resources designed to strengthen this new alliance between traditional academics and context-based knowledge and skills for employability. Excellent materials now exist for teaching applied communications, physics, math, biology, and chemistry. In social studies, however, the absence of any applied academics or Tech Prep resources is glaringly obvious.

Responding to many demands from partners and customers, AIT proposes to join with the National Council on Economic Education to develop a multimedia curriculum in applied economics to be called ***Workplace Economics***. AIT and the National Council share a history of highly successful partnerships in three previous economics curricula—all designed to support the teaching of the rather abstract concepts of economics. The organizations are now prepared to combine principles promulgated in the National Council's *Framework for Teaching the Basic Concepts* with the call for "workplace know-how" that lies at the heart of the recent SCANS report, *Learning a Living*.

Workplace Economics will also be developed with the involvement and advice of a number of key organizations and educators. Principal among these is Junior Achievement, Inc., Colorado Springs, Colorado.

The result of this collaboration will be a comprehensive, multimedia-based, applied economics curriculum designed to enable secondary students to draw upon economic knowledge to comprehend complex economic issues and their impact on the workplace and on public policies, to make informed decisions, and to succeed in career experiences as productive citizens.

The series that is proposed, ***Workplace Economics***, will be delivered on a set of five double-sided, interactive laserdiscs containing instructional, assessment, and inservice training material supported by corresponding student and teacher resource guides. Seven software diskettes will provide students with further practice material related to general vocational areas. The course's design will embody characteristics of authentic learning found in research by the Center on Organization and Restructuring of Schools. Regional ***Workplace Economics*** Institutes with an accompanying workshop leader's guide will drive and support local implementation efforts. Subject to funding, a North American teleconference with a videotape of highlights may also be produced.

Workplace Economics is projected to require 20 months to complete at a cost of $1,906,129.

Rationale and Need

Tech Prep, or applied academics, is an educational initiative to prepare youth for participation in a world-class work force and a future that includes lifelong learning and relearning for all. According to the National Center for Research in Vocational Education (1993), the Tech Prep movement seeks to meet the needs of both student and employer.

Table 1: What Tech Prep Means to Students and Employers

Benefit to Students	Benefit to Employer
▶ Increased levels of job satisfaction through greater knowledge of the economic conditions under which their employer operates ▶ Relevance and utility of what is learned ▶ Possession of competencies that will facilitate career success (e.g., problem solving, teamwork, etc.) ▶ Acquisition of knowledge and enhanced understanding of the business world ▶ Greater likelihood of graduation	▶ Reductions in turnover, training, and retraining as a result of a more satisfied and stable work force ▶ Ease of generalization of learned skills from classroom to workplace ▶ Greater employer satisfaction with new additions to the work force, and modeling of problem solving, teamwork, and other competencies to members of the non-Tech Prep work force ▶ Greater pride in work performed through application of skills learned in school ▶ A better educated and able body of prospective candidates for future work force needs

Source: NCRVE (1993)

The Tech Prep movement also calls for an educational experience that is as rigorous as a college preparatory program, but that responds more directly to business and industry's real skill needs (ERIC, 1992). It attempts to motivate students and to provide a meaningful context for learning by demonstrating the relevance and use of academic skills in the current and future workplace. It encourages the expansion of technology education to include creative thinking, reasoning, problem-solving, and communication skills, as well as math and science, and emphasizes the integration of academic and career education. Tech Prep directly benefits the individual, business and industry, and society as a whole.

Applied academics curricula have been developed in the areas of science, mathematics, and English/ communications that are widely used as integral elements of the Tech Prep curriculum. Among these are *Applied Communication*, developed by AIT, *Principles of Technology*, developed by AIT and CORD, as well as *Applied Mathematics* and *Applied Biology and Chemistry*. The widespread use and success of these courses have strenghtened and gained new supporters and adherents for the Tech Prep movement (NWREL, 1992, 1993; SREB, 1992). At the September, 1993, National Tech Prep Network conference in Atlanta, 2700 participants were expected; 4000 came. Yet in spite of this large and growing recognition of the value of the Tech Prep curriculum, no substantial applied academics resources exist in social studies or business education.

Of all social studies fields, economics lends itself most naturally to an approach that focuses on an application of concepts and principles to problems and decision-making in the workplace (SREB, 1992). Students who will shortly be workers and voters need to develop sufficient understanding of the causes and consequences of changes in production, for example, to comprehend rising and falling prices, lay-offs, or plant closings. As governments at all levels grapple increasingly with economic problems, citizens and workers need to be able to understand and discuss complex issues. Finally, a realistic understanding of economic forces affecting the workplace is a critical component of the "workplace know-how" advocated in the recent SCANS reports, *Learning a Living* (1992).[1] Without such competencies, employers and workers at all levels are likely to make poor workplace decisions based on faulty economic understanding, and their companies, their jobs, and ultimately American prosperity may fall victim to economic ignorance.

Instructional materials, carefully designed and developed, are needed to provide students with a challenging and meaningful curriculum that applies economics to an understanding of the workplace. The Agency for Instructional Technology (AIT) and the National Council on Economic Education have entered into partnership three times previously to produce highly effective and widely used resources for traditional economics education in grades K–12. These include *Trade-Offs* (1978), a 15-program economic series viewed by tens of millions of middle school students; *Give & Take* (1982) for high school students; and *Econ and Me* (1989) for the primary grades. These existing economics curricula were not designed, however, for the learning styles of contemporary students, nor did they address the new need for a course that prepares students to apply economics concepts to realistic workplace issues.

Employing the latest instructional technologies and methods, AIT and the National Council on Economic Education propose to develop a multimedia, semester-long course that will help secondary tech prep students apply economics to real-life experiences. The curriculum will provide teachers with a broad-based applied economics curriculum to complement and enlarge the availability of applied courses now being taught.

---

[1] SCANS refers to the Secretary's Commission on Achieving Necessary Skills, a group convened by the former U.S. Secretary of Labor, Lynn Martin, under chairmanship of William E, Brock, to "encourage a high-performance economy characterized by high-skill high-wage employment."

Course Design

PROJECT TOPICS

Workplace Economics, a comprehensive, one-semester curriculum, will be organized around five economic activities—**producing, exchanging, consuming, saving**, and **investing**—each the topic of one module of the course. Students will study these activities intensively, discover the underlying societal behavioral patterns, and examine and investigate the concepts that explain them.

PROJECT GOALS

Teachers will use course materials to help students achieve the following goals and measure their attainment.

- Understand and interpret relatively commonplace economic events through the study and application of everyday economic concepts
- Acquire critical-thinking and decision-making skills needed for workplace and career decision making
- Comprehend the economic activities (producing, exchanging, consuming, saving, and investing) of individuals, companies, labor, and government, and the interdependence of these entities
- Understand the market system in a global economy
- Comprehend the impact of economic events on careers, the workplace, and lifelong learning

COMPETENCIES

The U.S. Department of Labor's 1992 SCANS competencies (see Appendix A on page 17) will be integral to each module. These include

- utilizing resources
- working with others
- acquiring and using information
- recognizing interrelationships among economic systems
- working with technologies

These competencies combined with the basic economic concepts taught in the course will provide students with a cognitive repertoire that will facilitate effective decision-making practices throughout their school and career lives.

PROJECT CHARACTERISTICS

The instructional materials will

- enhance Tech Prep and other applied academics initiatives and approaches
- enhance economic understanding in the presentation and teaching of economic concepts, as outlined in the National Council's *Framework*

- introduce students to familiar, understandable, compelling, and realistic applications of economic concepts that will help them in the actual workday world
- provide opportunities for students to develop critical-thinking and decision-making skills across the curriculum through challenging but practical instructional activities
- capture student interest through the use of dramatic and documentary video presentations featuring ethnically and racially diverse young adults, both male and female, in various urban and non-urban settings
- include teaching activities consistent with the standards of authentic instruction
- provide structured interdisciplinary materials and activities for infusing thinking and decision-making skills into vocational, civics, and mathematics classes
- be adaptable for non-traditional students for which content is germane (e.g., adult education programs, JTPA[2] training)

INSTRUCTIONAL APPROACH

Workplace Economics lessons will exploit videodisc technology to present economic issues in the context of realistic workplace illustrations and documentary case studies. For each illustration, students will be required to learn, elucidate, and apply basic economic concepts by answering the questions, **"Why?"**—what is the cause of certain events?—and **"So what?"**—what are the consequences of those events? Each lesson within a module will anchor an economic problem to the challenges faced in a real-life workplace setting recorded on videodisc (e.g., quality control at GM's Corvette Assembly Plant). This approach, which involves confronting and solving real workplace problems, has proven highly effective for student learning outcomes (Cognition and Technology Group at Vanderbilt, 1990).

Lesson design and student activities will be driven by the five standards of authentic instruction described by Newman and Wehlage (1993) of the Center on Organization and Restructuring of Schools. These five standards are higher order thinking, depth of knowledge, connectedness outside the classroom, substantive conversation, and social support for achievement. In ***Workplace Economics***, these standards will be integrated in the curricular design in the following ways.

- **Higher-order thinking.** The course will require students to manipulate economic information and concepts; generalize about events and their effects; speculate and hypothesize about causes and consequences; analyze, interpret, and explain complex workplace situations; and draw conclusions from observation and data.
- **Depth of knowledge.** The course will be designed with sufficient time and background provided to permit students to analyze situations in depth, make distinctions between them, create arguments and construct explanations to support them, and investigate and explain a variety of consequences.

---

[2] The Jobs Training Partnership Act, signed into law by President Reagan in October 1982, provides job training for unskilled, disadvantaged youths and needy adults.

- **Connectedness outside the classroom.** The illustrations will connect each economic principle and concept with actual business, real workers, and the personal activities and experiences of the students.
- **Substantive conversation ("talking to learn and understand the substance of a subject").** The instructional materials will be designed with activities for group interaction, sharing of experiences, and cooperative analysis and problem solving to reach a coherent and reasoned understanding and consensus.
- **Social support for achievement ("high expectations, respect, and inclusion of all students in the learning process").** While a single curriculum, by itself, cannot change a school's learning climate and culture, the teaching suggestions and inservice information on the videodisc and in the annotated student resource guide will help teachers convey high expectations, encourage risk-taking, and challenge students to improve. In addition, the teacher materials will encourage interdisciplinary cooperation and promote staff collegiality. The student materials will be user-friendly and inviting, but at the same time require learners to grapple with sophisticated concepts and real problems. Ultimately they will be provided with ample opportunities to take pride in genuine achievement.

COURSE AND LESSON ORGANIZATION

Workplace Economics will be organized in five modules, available on five double-sided laserdiscs with corresponding student and teacher resource guides. Each module will be supported by seven computer diskettes, each with a menu that directs students to relevant career activities. There will be one module for each of the course's five topics. A module will range in length from six to ten lessons taught over twelve to twenty 50-minute class periods. (Most lessons will require more than one class period to teach.) The five modules will provide a comprehensive 75-class period (semester-long) applied economics experience.

The first lesson of the first module will contain an overview showing how economic events affect various career areas, and it will dramatize the effect of the events on people at work. This introductory lesson will establish the need for an understanding of the economic concepts behind the depicted illustrations and develop student motivation and interest in the course.

During the lessons that follow, students will apply basic economic concepts to their own and others' experiences in specific, realistic contexts showing **producing, exchanging, consuming, saving,** and **investing.** The lessons' economic content will be drawn from *A Framework for Teaching the Basic Concepts*, the National Council's Master Curriculum Guide in Economics (1993). Lessons will introduce **an economic event** in general terms through the printed guide: "Some firms earn profits in excess of industry averages." A specific example or **illustration in a real-world context** will then be presented on a videodisc (accessed by barcodes in the teacher's version of the guide) or videocassette: "The median profit in the beverage industry was 10 percent of equity, but Coca-Cola's profits in 1992 were 43 percent." The range of proposed contextual illustrations and events in each module is suggested by the tables in Appendix B (pages 18–23).

During the lesson's "substantive conversation," a discussion is held in which the relevant **economic concepts** are elucidated or invoked to answer the question, **"why?"** Market structure, supply, and demand, for example, must all be understood and applied to an analysis of Coca-Cola's performance. To consider the consequences of the situation, students must take account of issues of resource allocation, efficiency, and equity. Further documentary case studies and realistic, dramatized scenarios on the videodisc will help students understand economic events and apply and generalize economic concepts to explain workplace experiences.

Each module will close with cooperative learning activities. Groups of students will select from the appropriate computer diskette a challenging problem scenario **related to the general career areas** they have chosen (health care, business and computing, etc.). Available for both IBM® compatible and Macintosh® computers, the software will present a contextual illustration, much like those on the videodisc, and then provide students—working individually or in groups—with opportunities to explore a variety of paths and models to answer **why?** and **so what?** questions.

The interactive features of the software will permit students to examine, analyze, and solve the problem by drawing on the concepts they have learned. For example, to conclude the module on investing, a group of four students with a common interest in agriculture could select a problem facing the owner of a farm supply business who invests in an expensive seed-cleaning operation although she will lose money on the investment during the first year. Students would then collaboratively apply and generalize the economic principles they have learned and test explanations and consequences using economic analysis. They might also use such problem scenarios to explore alternative career areas, or teachers might utilize the software for assessment.

Finally, follow-up or field activities will provide opportunities for students to gain actual experience with the economic principle under study and to integrate knowledge from other curricular areas. Field activities might include "shadowing" community workers, an abbreviated youth apprenticeship, field trips to establish further connections between the classroom and the outside world, and survey projects that enable students to gather data on economic issues in an attempt to forecast consumer behavior. Such activities will provide ideal opportunities for information to flow from business and industry to the classroom, a central component of the SCANS *Learning a Living* report.

STUDENT MATERIALS

Course materials will draw on the resources of print, videodisc, videocassette, and computer software.

Interactive videodisc. Videodiscs will be used to present realistic workplace settings, inviting scenarios, graphics, and high-quality animation. They will also provide instantaneous and random access to every contextual illustration in the module. For example, while teaching the second lesson in the module on **producing**, a teacher who wishes to show the illustrative segment on **hiring and firing** (part of the fifth lesson) may do so instantaneously by simply locating the appropriate barcode in the teacher's guide and swiping it. (The random access feature also enables utilization of videodisc material for assessment purposes.) Schools are increasingly acquiring and using barcoded videodisc, which is quickly becoming the instructional medium of choice (Lookatch, 1993).

In addition, up to four parallel audio tracks will permit a more active integration of video, student thinking, and dialogue. The first audio track accompanies the video footage. When the screen prompts students to select one of several alternatives in response to a question or problem, the two other audio tracks will lay out the consequences of these choices. (The fourth track is reserved for the teacher audiotutor. See "Teacher Support and Training," below.)

Videocassette. The project will also provide the videodisc material on 300 minutes of videocassette for schools where videodisc players are not yet available. However, random access, branching for alternative choices, and multiple audiotracks (including the teacher audiotrack) are not possible with videocassette technology.

Print. The student resource guides will

- contain instructions for using the videodisc
- introduce key concepts and terms
- pose or develop problems
- provide information and instructions necessary for learning activities
- present text and data to stimulate activities focusing on specific career areas

Software. Seven software diskettes, each one featuring problem illustrations from a general vocational area (agriculture, natural resources; business/computer technologies; communication technologies; construction and design; engineering technologies; health/human services; mechanical/transportation). Each diskette will have a menu listing the five modules so that students can select the illustration most closely tied to the subject they are studying. All diskettes will be available for both IBM® compatible and Macintosh® computers.

TEACHER SUPPORT AND TRAINING

What occurs in the classroom before, after, and in some cases during a video-based presentation is as critical to learning as the video presentation itself. Research on the effectiveness of two prior video-based economics series (***Trade-offs*** and ***Give & Take***) revealed that students of teachers trained to use the series significantly outperformed students of teachers who were not trained in utilization. Accordingly, the new course will incorporate a teacher education component.

Videodisc. In addition to many hours of disc-based instruction for students, teachers will find up to five hours of disc-based orientation for formal or informal staff development. One of the four parallel audio tracks available on each disc will offer teachers suggestions for lesson planning, teaching strategies, and class management that are relevant to the accompanying video segment. The audiotutor track will suggest types of student questions to anticipate at various points, and will cue ideal methods and locations on the disc to facilitate classroom discourse. This design element extends the disc "real estate" well beyond that typically found while increasing teachers' "comfort-level" with the material and the technology. Thus, this technology provides a powerful, yet easy to operate, means of reaching both students and teachers.

Video. A 15-minute video program will be produced with an overview of project materials and demonstrations of actual classroom use.

Print. An annotated version of each student resource guide will help teachers use the instructional materials effectively. Each lesson in the teacher's guide will include the following.

- a complete text of the student guide
- a detailed lesson plan with
  - an introduction to the material
  - key economic concepts to be taught and used during the lesson
  - objectives of the lesson
  - recommended materials for teaching the lesson
  - activity suggestions with model instructional procedures
  - time required to complete each activity
  - closure activities to facilitate review and generalization
  - barcodes to access and drive interactive videodisc segments
  - suggestions for sequencing the learning activities effectively

plus

- ideas for coordinating interdisciplinary activities
- assessment sequences
- glossary of key terms
- a barcode index

Software. Teachers may use the contextual illustrations related to vocational areas found on the computer diskettes to encourage further career exploration or for assessment.

A Workshop Leader's Handbook. To guide the development of teacher trainers during implementation workshops, a workshop leader's handbook will be published. The handbook's focus will be on planning for local training of teachers, demonstrating effective uses of project components to enhance the application of economic concepts, and integrating ***Workplace Economics*** with other Tech Prep, vocational, and academic curricula. In addition, a detailed syllabus for local training sessions and a model syllabus for informational workshops will be provided. They will include activities to enhance delivery skills and stimulate the interest and enthusiasm of local teachers.

Workplace Economics **Education Institutes (WEEI).** Upon completion of product development, a series of four two-day ***Workplace Economics*** Education Institutes will be conducted regionally throughout the United States. The institutes will prepare participants for delivery of teacher workshops at the local level. Participants with well-established reputations as teacher trainers will be selected to attend the WEEI scheduled for their region. The workshop facilitators will be supported by a workshop leader's handbook (above).

Teleconference. Subject to funding, additional implementation efforts will include a two-hour teleconference for teacher trainers and curriculum coordinators across North America. It will be broadcast by satellite to downlink sites selected and organized by local affiliates of the National Council on Economic Education. Teacher trainers and curriculum coordinators will be invited to participate in the closed broadcast, which will feature panelists from the National Council on Economic Education and educators with credentials in Tech Prep, social studies, and vocational education. An experienced workshop leader will demonstrate the project materials and show excerpts from programs. Using telephone links, participants at the various sites will be able to call in their questions or participate in discussions.

Teleconference tape. Following the suggested teleconference, AIT will edit the footage of the teleconference to provide a videotape—not more than an hour in length—of the highlights. Such a tape could become a valuable utilization tool.

Assessment. All project print, videodiscs, and videocassettes may be used with groups or individuals for contextually rich assessment. Any of the illustrations on the videodisc and videotape may serve as the basis for an assessment exercise. The career-relation application materials in the guides may be used for lesson assessment at the end of a module. The teacher's annotated version of the student resource guide will include barcodes that open a series of assessment opportunities relevant to each lesson. These will enable teachers to bring assessment questions to life with context-setting video prompts.

CURRICULUM INTEGRATION: ECONOMICS AND CIVICS SYMBIOSIS

There is virtually no decision made by government that does not affect the economy. There is a close relationship between economic and political systems, and each influences, and is influenced by, decisions made by individuals. When consumers choose to purchase a product packaged in non-biodegradable material, their decision affects the economy and body politic alike. When they choose not to purchase a particular product because of the political or moral position of its producer, their decision affects production, employment, and politics. Throughout ***Workplace Economics***, such overlapping and competing economic and political interests will be highlighted, providing the core of an applied civics curriculum. Eventually such a curriculum may be developed by AIT and capitalize on some of the same illustrative examples presented in the economics curriculum. In the meantime, such ready applicability to civics extends the relevance of ***Workplace Economics*** in applied academics.

Deliverables and Components

Deliverables will consist of videodiscs, videocassettes, computer software, and print, as well as opportunities to participate in a national consortium meeting, workshops, and a proposed teleconference. They are summarized in the table below.

Table 2: Project Deliverables and Components

Component	Quantity
▶ Interactive Videodisc	▶ Five double-sided laserdiscs (one per module; includes student video, teacher audiotutor, and assessment material)
▶ Videocassettes	▶ 300 minutes on five 60-minute VHS tapes containing linear versions of laserdisc material
Teacher Training Video	One 15-minute videocassette
Teleconference Video*	One 1-hour tape showing highlights of teleconference
▶ Print Materials	▶ Five student resource guides (one for each module) Five teacher's resource guides (annotated versions of the student guides) One workshop leader's handbook
▶ Software	▶ Seven diskettes each for IBM® compatible and Macintosh® computers containing illustrative problem scenarios from seven different general occupational areas
▶ Duplication License	▶ Duplication rights for videocassette and computer software
▶ Preferred Pricing	▶ Additional copies of materials available for purchase at discounted prices
▶ National Consortium Meeting	▶ Two representatives from each participating agency may attend the consortium meeting at no expense, with travel and accomodations paid by the project
▶ North American Teleconference*	▶ One site registration
▶ *Workplace Economics* Education Institutes	▶ Four individual registrations

*Component subject to funding availability.

Operational Aspects

PROJECT MANAGEMENT

The project will be managed by the Agency for Instructional Technology (AIT), in association with the National Council for Economic Education. AIT is a not-for-profit organization dedicated to strengthening education through the use of video, computers, and other technologies.

AIT has developed 34 series, with associated curriculum and information activities, in cooperation with consortia of state and provincial agencies. These series are widely used in classrooms throughout the United States and Canada. The Joint Council for Economic Education (predecessor of the National Council on Economic Education) and the Canadian Council on Economic Education were active partners in the development and dissemination of such projects for economic education as ***Trade-offs*, *Give & Take*, *Econ and Me*,** and ***Understanding Taxes***. AIT has also produced such Tech Prep and related thinking-skills projects as ***Applied Communication*, *Principles of Technology*** (with CORD) and ***Workplace Readiness***.

AIT will assume responsibility for developing the instructional video materials for this project while consulting with—and being accountable to—the state, provincial, and economic education agencies participating in the project. If a training teleconference is funded, AIT will provide the technical support and will produce a videotape containing teleconference highlights.

The National Council will assume responsibility for the development of the print component of the curriculum, with editing by AIT and review by participating education agencies. The National Council will also develop, organize, and manage the training workshops (WEEI) and the proposed teleconference, and advise AIT in its development of the audiotutor track on the videodiscs.

A number of key organizations and educators will also be involved and contribute advice to the development of ***Workplace Economics***. Principal among these is Junior Achievement, Inc., Colorado Springs, Colorado.

DEVELOPMENT OF MATERIALS

All development will be done cooperatively, with full involvement of supporting agencies. Design and development of modules will address the comprehension and skill objectives outlined in this document.

COOPERATIVE DEVELOPMENT PROCESS

Workplace Economics course components will be designed and created through a systematic process of cooperative—or consortium—development. Representatives from state and provincial education agencies, as well as from the National Council on Economic Education, will be involved throughout the project as reviewers, evaluators, and meeting participants. They will monitor the project's status, review the design and development of all instructional materials, and participate in planning for implemention. As a consequence, those responsible for introducing and supporting the materials in their areas of jurisdiction will be part of the development process. Through their own involvement, these people and others at their agencies will ensure the effective utilization of project materials.

CONSORTIUM MEETING

As part of the review process, representatives of participating agencies will meet to evaluate prototype materials and instructional design. The project budget includes the cost of sending two representatives per state to a consortium meeting (one representing the state agency and one representing the economic education agency). Additional representation is encouraged but will be at the expense of the participating agency. The participation fee for an agency can be adjusted to include the costs of more than two representatives at the consortium meeting.

Once the content and objectives have been established and specific approaches to instruction determined, instructional materials will be prepared. These will be reviewed by subject-matter experts, representatives of participating agencies, teachers, students, and specialists in the work force. Revisions will be based on these reviews.

Selected modules, including their print, video, and videodisc components, will be reviewed by participating organizations and specialists at the consortium meeting and through mailed reviews.

EVALUATION

Evaluation materials keyed to project objectives will be created. In addition to the review of materials at the consortium meeting, design documents, treatments, and scripts and prototype video and print materials developed for this project will be mailed out for review by members of the organizations supporting the project, content specialists, instructors, and other specialists in economics and education. Questionnaires and rating sheets will be developed to solicit evaluation on such criteria as curriculum fit, ease of use, relevance and appropriateness of materials, appeal to teachers and students, and learning outcomes.

Materials, including student activities, will also be field-tested with target-age students and their instructors to evaluate appeal, appropriateness, and learning outcomes. Results of all evaluation activities will be applied to the revisions of existing materials and will shape those under development.

DELIVERABLES AND RIGHTS

Each participating agency will receive one set of project materials, including all videos, videodiscs, and print materials and the right to make and use copies of the linear videos and computer software, as needed for learners' within the jurisdiction it serves. (See the table on page 11 for a complete list of deliverables.) Additional copies of all materials will be available for purchase by participating agencies at preferred prices.

Each participating agency also will receive preliminary instructional materials for review, promotional materials, and periodic progress reports about project activities. Subject to funding availability, participating agencies will be offered opportunities to participate in an implementation teleconference and teacher training workshops.

SCHEDULE

Project Schedule

Consortium Formation	February 1994 - September 1994
Instructional Design	February 1994 - August 1994
Production and Evaluation	April 1994 - June 1995
Consortium Meeting	July 1994
Promotion/Information	May 1995 - December 1995
Workshop Delivery	Summer 1995 - on-going
General Delivery	August 1995

BUDGET

The total cost of the project is $1,906,129. Major expenditure categories are as follows.

Development and Funding	$207,661
Consortium Relations (includes consortium meeting)	99,138
Instructional Design	112,285
Production—Laserdisc and videotapes	659,289
Production—Software	110,459
Production—Print	260,545
Formative Evaluation	22,215
Promotion/Information	31,334
Distribution	18,542
Teacher Training	384,661

Fees for Participating Agencies*

Based on this budget, significant private sector funding, and the participation of 35 state and provincial agencies, the fee for each agency is listed on page 15. These fees were calculated based on a sliding scale depending upon student enrollment in each agency ($5,000 U.S., plus 3¢ per pupil).

Substantial discounts are available for committing early with a signed contract.

40% off for signing by July 10, 1994
30% off for signing by October 10, 1994
20% off for signing by January 10, 1995
10% off for signing by April 10, 1995

---

* For the United States, K–12 population figures are from the *Statistical Report* (June 1992) from the U.S. Department of Education, National Center for Education Statistics. Canadian figures are from *Enrollment in Elementary and Secondary Schools in Canada* (1991–92) from Statistics Canada.

Participation Fees

State/Province	K–12 Pop.	Fee
Alabama	721,806	$26,654
Alaska	113,674	$8,410
Alberta	519,936	$20,598
American Samoa	12,403	$5,374
Arizona	639,853	$24,196
Arkansas	438,286	$18,149
British Columbia	587,920	$22,638
California	4,950,196	$153,506
Colorado	574,213	$22,226
Connecticut	469,123	$19,074
Delaware	99,658	$7,990
District of Columbia	80,694	$7,421
Dept. of Defense Depnd. Schools	100,000	$8,000
Florida	1,861,592	$60,848
Georgia	1,151,687	$39,551
Guam	26,483	$5,794
Hawaii	171,708	$10,151
Idaho	220,840	$11,625
Illinois	1,821,407	$59,642
Indiana	954,581	$33,637
Iowa	483,652	$19,510
Kansas	437,034	$18,111
Kentucky	635,401	$24,062
Louisiana	784,757	$28,543
Maine	215,149	$11,454
Manitoba	220,515	$11,615
Maryland	715,176	$26,455
Massachusetts	834,314	$30,029
Michigan	1,581,925	$52,458
Minnesota	756,374	$27,691
Mississippi	502,417	$20,073
Missouri	812,234	$29,367
Montana	152,974	$9,589
Nebraska	274,081	$13,222
Nevada	201,316	$11,039
New Brunswick	142,687	$9,281
Newfoundland	125,492	$8,765
New Hampshire	172,785	$10,184
New Jersey	1,089,648	$37,689
New Mexico	301,881	$14,056
New York	2,598,337	$82,950
North Carolina	1,086,871	$37,606
North Dakota	117,825	$8,535
Nova Scotia	168,897	$10,067
Ohio	1,771,576	$58,147
Oklahoma	579,087	$22,373
Ontario	2,035,618	$66,069
Oregon	484,652	$19,540
Pennsylvania	1,667,834	$55,035
Prince Edward Island	24,754	$5,743
Puerto Rico	644,734	$24,342
Québec	1,145,055	$39,352
Rhode Island	138,813	$9,164
Saskatchewan	212,071	$11,362
South Carolina	622,112	$23,663
South Dakota	129,164	$8,875
Tennessee	824,595	$29,738
Texas	3,382,887	$106,487
U.S. Virgin Islands	21,750	$5,653
Utah	447,891	$18,437
Vermont	95,762	$7,873
Virginia	998,601	$34,958
Washington	839,709	$30,191
West Virginia	322,389	$14,672
Wisconsin	797,621	$28,929
Wyoming	98,226	$7,947

BEST COPY AVAILABLE

References

Cognition and Technology Group at Vanderbilt. Anchored instruction and its relationship to situated cognition. *Educational Researcher* 19 (1990): 2–11.

ERIC Clearing House on Adult Career and Vocational Education. (1992). *Trends and Issues—Tech Prep.*

Lookatch, R. How to look at video technology. *Executive Educator* 15 (1993): 12–14.

National Council on Economic Education. *Framework for Teaching the Basic Concepts: Master Curriculum Guide in Economics.* New York: Author (1993).

Newman, F., and G. Wehlage. Standards for authentic instruction. *Issues in Restructuring Schools* 4 (1993): 3–6.

Northwest Regional Education Laboratory (NWREL). Student scores increase significantly in several applied academics programs. *Tech Prep Networker* (January 1992): 2–3.

Saunders, P., G.L. Bach, J.D. Calderwood, and W.L. Hansen. *Entering a New Era in Vocational Education: Highlights of the June, 1992, NCRVE Tech Prep Leadership Summit.* Berkeley, CA: National Center for Research in Vocational Education (NCRVE) (1993).

SCANS. *Learning a Living: A Blueprint for High Performance.* Washington, DC: Department of Labor (1992).

Southern Regional Education Board (SREB). *Making High Schools Work.* Atlanta: Author (1992).

U.S. Department of Labor. *What Work Requires of Schools: A SCANS Report for Americaa 2000.* Washington DC: Author (1991).

Appendix A: Five Competencies

These five competencies were listed in *What Work Requires of Schools: A SCANS Report for America 2000*, published by the U.S. Department of Labor in 1991.

Resources: Identifies, organizes, plans, and allocates resources

A. *Time*—Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules

B. *Money*—Uses or prepares budgets, makes forecasts, keeps records, makes adjustments to meet objectives

C. *Material and Facilities*—Acquires, stores, allocates, and uses materials or space efficiently

D. *Human Resources*—Assesses skills and distributes work accordingly, evaluates performance and provides feedback

Interpersonal: Works with others

A. *Participates as Member of a Team*—Contributes to group effort

B. *Teaches Others New Skills*

C. *Serves Clients/Customers*—Works to satisfy customers' expectations

D. *Exercises Leadership*—Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies

E. *Negotiates*—Works toward agreements involving exchange of resources, resolves divergent interests

F. *Works with Diversity*—Works well with men and women from diverse backgrounds

Information: Acquires and uses information

A. *Acquires and Evaluates Information*

B. *Organizes and Maintains Information*

C. *Interprets and Communicates Information*

D. *Uses Computers to Process Information*

Systems: Understands complex interrelationships

A. *Understands Systems*—Knows how social, organizational, and technological systems work and operates effectively with them

B. *Monitors and Corrects Performance*—Distinguishes trends, predicts impacts on system operations, diagnoses systems' performance and corrects malfunctions.

C. *Improves or Designs Systems*—Suggests modifications to existing systems and develops new or alternative systems to improve performance

Technology: Works with a variety of technologies

A. *Selects Technology*—Chooses procedures, tools or equipment including computers and related technologies

B. *Applies Technology to Task*—Understands overall intent and proper procedures for setup and operation of equipment

C. *Maintains and Troubleshoots Equipment*—Prevents, identifies, or solves problems with equipment, including computers and other technologies

Appendix B: Content of Modules

Module 1—Producing. The activities and institutions needed to transform human and nonhuman resources into goods and services that satisfy individual and collective wants.

Contextual Illustration[1]	Economic Event	Concepts		Class Periods
		Why?[2]	So What?[3]	
Overview of economic activities in various occupational areas and how they affect persons working in those industries and elsewhere. Lessons will establish the need for an understanding of economics concepts and will help develop motivation.	Introductory lesson			1
GM earned $4.2 billion in 1989 and lost $23.5 billion in 1992.	Profits rise and fall and some firms incur losses.	Market structure, demand, supply	Resource allocation, efficiency, equity	2
Coca-Cola profits in 1992 were 43% of equity. The beverages industry median profit was 10% of equity. In the soaps and cosmetics industry, where the median profit as a percent of equity was 14%, Avon earned 56%.	Some firms earn profits in excess of industry averages.	Market structure, demand, supply	Resource allocation, efficiency, equity	2
The cable TV industry is moving to fiber optic cable to deliver information services to homes and businesses.	Across time, firms in an industry tend to adopt the same input and technology mix.	Input prices, competition, demand, costs, profit	Efficiency, equity	2
In the computer and office equipment industry (25 companies), 11 companies employed fewer workers in 1992 than in 1991. Wang laboratories led the way with a 29% decrease; IBM employment fell 11%. On the upside, smaller firms in the industry increased employment; AMDAAL by 52% and Gateway by 43%.	Businesses hire and fire workers and close entire plants.	Competition, demand, costs, profit	Efficiency, equity, economic stability	2
If NAFTA is implemented, U.S. apparel imports from Mexico may rise 60% over the long term. U.S. apparel exports may increase 30%.	The output of some firms is sold outside the United States.	Comparative advantage, competition, demand, input and output prices	Efficiency, equity, economic stability, economic growth	2
The production of steel is more labor-intensive in China because the relative price of labor in China is less than the price of capital.	The resource mix used to produce a good may vary from nation to nation.	Input prices, technology, productivity	Efficiency	2

Continued on page 19

Module 1—Producing. (Continued from page 18)

Contextual Illustration[1]	Economic Event	Concepts		Class Periods
		Why?[2]	So What?[3]	
Teenagers have a difficult time finding employment during a recession.	Unemployment increases during recessions.	Aggregate demand, employment	Efficiency	1
A partially completed motel occupies the intersection of I-69 and State Road 18 near Marion, Indiana.	Projects are not always completed.	Scarcity, cost-benefit analysis, incentive	Economic security, economic justice, economic stability	2
Additional illustrations of producing, with examples from different vocational areas, are provided for cooperative problem-solving on software diskettes. Students clustered in small groups by vocational interest read an illustration matching their vocational interest. Then, they generalize learned economic principles to test and identify explanations and consequences in economic terms.	Application lesson			2
Opportunities to investigate "producing" in a structured independent field activity and to share the results with peers.	Field activity			2

1. Contextual illustrations used in the series will be determined by a focus group which includes Tech-Prep students and teachers.
2. The relevant economic concepts found under the "Why?" column will be expanded as needed during the instructional design phase of the project.
3. The "So What?" question addresses the efficiency, equity, and economic goals aspects of the experience.

Module 2—Exchanging. The activities and institutions needed to get what is produced to consumers.

Contextual Illustration[1]	Economic Event	Concepts		Class Periods
		Why?[2]	So What?[3]	
Sally ordered a new VCR using Prodigy, a computer network.	Firms sell goods and services in many types of markets.	Costs, markets	Efficiency	2
"Don't leave home without it." Not money, but your credit or debit card.	Businesses accept many forms of payment.	Functions and characteristics of money	Efficiency	1
Automobiles made in the United States contain steel manufactured in Germany.	Firms purchase foreign-produced goods and services.	Functions of money, foreign exhange, transaction costs	Efficiency	1
Check the curb after a major holiday; is all that trash necessary?	Firms must prepare goods for shipment and display.	Transportation, merchandising	Efficiency, externalities	2
The purchasing power of the dollar received by creditors may be less when inflation is unanticipated.	Some people benefit and others get hurt by inflation.	Debtor, creditor, anticipated and unanticipated inflation	Efficiency, equity, economic stability	2
Additional illustrations of exchanging, with examples from different vocational areas, are provided for cooperative problem-solving on software diskettes. Students clustered in small groups by vocational interest read an illustration matching their vocational interest. Then they generalize learned economic principles to test and identify explanations and consequences in economic terms.	Application activity			2
Opportunities to investigate "exchanging" in a structured independent field activity and to share the results with peers.	Field activity			2

---

1. Contextual illustrations used in the series will be determined by a focus group which includes Tech-Prep students and teachers.
2. The relevant economic concepts found under the "Why?" column will be expanded as needed during the instructional design phase of the project.
3. The "So What?" question addresses the efficiency, equity, and economic goals aspects of the experience.

BEST COPY AVAILABLE

Module 3—Consuming. The activities and institutions needed to satisfy individual and collective wants.

Contextual Illustration[1]	Economic Event	Concepts Why?[2]	 So What?[3]	Class Periods
Nationwide, the average price consumers paid for selected grocery items was $82.20, down $1.01 from the year-earlier period, while the average price of pharmaceuticals increased.	Some prices increase and some decrease in a year.	Competition, demand, supply, government regulation	Efficiency, equity	2
Shoppers in California, the most expensive region according to a recent survey, forked over $88.77 for the same listed items that cost shoppers in southeastern states $10 less. A laser printer in Japan costs $2,172, but only $1,550 in the United States.	Prices for the same product vary between types of businesses, areas in a city, cities in a state, states in a nation, and countries.	Competition, demand, supply	Efficiency, equity	2
The price of some goods may increase as a result of pollution regulations.	Government regulations influence market prices through their impact on buyer and seller behavior.	Market structure, asymmetrical information, externalities	Efficiency	2
An independent trucker finds that gas prices go up overnight—making it hard to estimate costs for long trips—but expected falls in prices are a long time in coming.	Price increases seem to occur immediately, while price decreases seem to occur over a longer period of time, if at all.	Demand, supply, equilibrium price, incentives, inventory	Efficiency, equity	2
The average Mexican consumes $380 worth of U.S. products a year—$20 more than the average Korean, whose income is twice as high.	Some goods and services are produced locally; others are produced in distant places.	Comparative advantage, input prices, transportation costs	Efficiency	3
The unemployed purchased more used clothing, furniture, and appliances than the employed.	The unemployed usually do not have enough income to buy what they want.	Income, employment	Economic stability	2
Additional illustrations of consuming, with examples from different vocational areas, are provided for cooperative problem-solving on software diskettes. Students clustered in small groups by vocational interest read an illustration matching their vocational interest. Then they generalize learned economic principles to test and identify explanations and consequences in economic terms.	Application activity			2
Opportunities to investigate "consuming" in a structured independent field activity and to share the results with peers.	Field activity			2

1. Contextual illustrations used in the series will be determined by a focus group which includes Tech-Prep students and teachers.
2. The relevant economic concepts found under the "Why?" column will be expanded as needed during the instructional design phase of the project.
3. The "So What?" question addresses the efficiency, equity, and economic goals aspects of the experience.

Module 4—Saving. The activities and institutions needed to satisfy the preference to consume less now.

		Concepts		Class
Contextual Illustration[1]	Economic Event	Why?[2]	So What?[3]	Periods
My bank pays 3% on my savings accounts but charges 5.9% for a 36-month new car loan.	Banks and other financial institutions pay lower interest to depositors than they charge to borrowers.	Market structure, supply, demand, costs, risk	Efficiency, economic growth	2
The cash price of a new CD player of $733.95 becomes a credit price of $892.76 when financed at 18% for 21 months.	To consume more now requires less consumption later; to consume more later requires less consumption now.	Scarcity, income, choice, opportunity cost, interest rate	Efficiency	2
Acme Plumbing will invest in a project returning 8% if the cost of borrowing money is less than or equal to 8%.	When the interest rate decreases, personal income falls, but business investment tends to increase.	Income, opportunity cost, cost-benefit analysis, profit	Efficiency, equity, economic growth	2
My local bank pays 3% interest on my account where I'm saving for a new CD player, and the same interest on my sister's account of savings for nursing school tuition.	The interest paid on savings accounts is the same, regardless of the reasons for saving.	Demand, supply, interest rate	Efficiency, equity	2
Individuals may save more as the interest rate increases.	Changes in the money supply may change interest rates.	Money supply, interest rates	Efficiency, economic stability	2
Additional illustrations of saving, with examples from different vocational areas, are provided for cooperative problem-solving on software diskettes. Students clustered in small groups by vocational interest read an illustration matching their vocational interest. Then they generalize learned economic principles to test and identify explanations and consequences in economic terms.	Application activity			2
Opportunities to investigate "saving" in a structured independent field activity and to share the results with peers.	Field activity			2

---

1. Contextual illustrations used in the series will be determined by a focus group which includes Tech-Prep students and teachers.
2. The relevant economic concepts found under the "Why?" column will be expanded as needed during the instructional design phase of the project.
3. The "So What?" question addresses the efficiency, equity, and economic goals aspects of the experience.

Module 5—Investing. The activities and institutions needed to increase resources and productivity.

Contextual Illustration[1]	Economic Event	Concepts		Class Periods
		Why?[2]	So What?[3]	
Census data shows that the median income of male college graduates in 1986 was 40% higher than that of nongraduates. For female graduates, the difference was 40.5% in 1986, up from 27.9% in 1979.	Well-trained and educated workers earn more than other workers.	Productivity, demand, supply, opportunity cost	Efficiency, equity	2
For payment of $100 next year and an interest rate of 5%, how much will I loan today?	One hundred dollars payable next year is worth less than $100 today.	Opportunity cost, discounting, interest rate	Efficiency	1
Tom's father is an art teacher working for an insurance company.	Some highly educated people do not find work in their principal areas of study.	Specialization, competition, demand, supply, surplus	Efficiency, equity, economic security	1
The work-hours required to produce 100 bushels of wheat decreased from 373 in 1800 to 7 work-hours in 1970.	People are replaced by machines in the production of goods and services.	Input prices, substitution, productivity, profit	Efficiency, equity, economic security, economic stability	1
Motorola calculates that every $1 it spends on training delivers $30 in productivity gains within three years. Since 1987 the company has cut costs by $3.3 billion—not by firing workers but by training them to simplify processes and reduce waste. In 1992 employment increased at Motorola by 5% over 1991. Most others in the industry showed decreases in employment in 1991–1992.	Workers receive on-the-job training.	Competition, productivity	Efficiency	2
A new factory is under construction in Middletown, Indiana.	Potential GDP increases as the result of investment.	GDP, investment, productivity, incentives	Economic growth, economic stability	1
Additional illustrations of investing, with examples from different vocational areas, are provided for cooperative problem-solving on software diskettes. Students clustered in small groups by vocational interest read an illustration matching their vocational interest. Then they generalize learned economic principles to test and identify explanations and consequences in economic terms.	Application activity			2
Opportunities to investigate "investing" in a structured independent field activity and to share the results with peers.	Field activity			2

1. Contextual illustrations used in the series will be determined by a focus group which includes Tech-Prep students and teachers.
2. The relevant economic concepts found under the "Why?" column will be expanded as needed during the instructional design phase of the project.
3. The "So What?" question addresses the efficiency, equity, and economic goals aspects of the experience.

AIT
The Learning Source

Agency for Instructional Technology
Box A, Bloomington IN 47402-0120
(800) 457-4509 or (812) 339-2203

EconomicsAmerica
National Council on
Economic Education

National Council on Economic Education
1140 Avenue of the Americas
New York, NY 10036
(212)730-7007

Printed in U.S.A.

Sisk
PONTIAC
PONTIAC DEALER

"LIFE SITUATIONS ENGLISH": PILOT LANGUAGE ARTS COURSE: GRADE NINE

A LANGUAGE ARTS COURSE EMPHASIZING COMMUNICATION SKILLS NECESSARY TO MEET THE DEMANDS OF CITIZENSHIP AND THE WORKPLACE

August 20, 1992

Sponsored by
Mt. Hood Community College and
the Mt. Hood Regional Cooperative Consortium

© E. Johnson &
MT HOOD REGIONAL
Cooperative Consortium

"LIFE SITUATIONS ENGLISH": PILOT LANGUAGE ARTS COURSE: GRADE NINE

A LANGUAGE ARTS COURSE EMPHASIZING COMMUNICATION SKILLS NECESSARY TO MEET THE DEMANDS OF CITIZENSHIP AND THE WORKPLACE

Acknowledgments:

In July 1992 Mt. Hood Community College and the Mt. Hood Regional Cooperative Consortium sponsored the Workshop on Integrating English and Professional/Technical Curriculum. "Life Situations English" reflects the contributions of the following workshop participants whose ideas, hard work, and dedication created a new approach to ninth-grade English.

Mary Bryson
Kelly Cole
Lynn Darroch
Doris Durrell
Karen Fenton
Susan Fields
Elaine Johnson
Tony Litzer
Errol Maddox
Larry McKinney
Steve Michener
Wendy Moore
Steve Roberts
Bobbi Thomas

Thanks are also due Michael Finnigan, Larkin Franks, Jeff Reardon, and Bill and Michelle Walker, workshop guests who shared their ideas and materials. To Jack Miller for his strong and generous leadership and Brenda Brady for help seeing to myriad details, "Life Situations English" is especially indebted.

CONTENTS

I. COURSE OUTLINE

II. APPENDIX: SUPPLEMENTARY MATERIALS

Assessment Recommendations (e.g., Portfolios)
Brainstorming
Evaluation of Group Performance
Flow Chart Diagrams
"The Cooperative Think Tank": Diagrams for Organizing Material:
    Ranking Ladder
    Venn Diagram
    Spectrum
    Web
    Agree/Disagree Chart
    Sequence Chart

Writing Strategies:

Descriptive Writing: Method and Chart
Describing an Historical Event: Method and Chart
Expository Writing: Method
Report Writing (Narrowing a Topic): Method
Essay Writing (Compare and Contrast): Method and Chart
Writing Definition
"The Purist." Ogden Nash
Planning Sheets: Giving Instructions
    Describing Process

Reading Material:

"The Battery"

From Anthologies (in order of appearance in appendix):

Shel Silverstein. "Clarence" (comic poem about television)
Shel Silverstein. "Jimmy Jet and His TV Set" (comic poem)
Edgar Allan Poe. "The Cask of Amontillado."
Richard Connell. "The Most Dangerous Game."
Shirley Jackson. "The Lottery."
Alice Munro. "Boys and Girls"
Ben Jonson. "On My First Son." (poem)
Robert Herrick. "Upon Julia's Clothes" (witty love poem)
Shakespeare. "Let me not to the marriage . . ." (love sonnet)

Shakespeare. "My mistress' eyes are nothing . . ." (ironic love sonnet)
Edwin Arlington Robinson. "Mr. Flood's Party" (about a lonely man)
Edwin Arlington Robinson. "Richard Cory"
Anon. "The Sacrifice of Isaac" (A medieval play presenting Abraham's dilemma and raising questions about relationships.)
Marge Piercy. "To Be of Use" (poem on people who love work)
"Working Classics: Poems on Industrial Life"

Critical Thinking Materials:

Problem Solving
Steps in Decision Making
Critical Thinking Games (Problems and Explanations)
"A Case of Red Herrings: Solving Mysteries Through Critical Questioning" (games)
Question Matrix
Critical Reading to Arrive at a Thesis
"You Decide! Applying the Bill of Rights to Real Cases" (assignments and teacher's manual)
"Who's to Say What's Right and Wrong?"
"Critical Thinking Handbook: 6th - 9th Grades"
   Suggested lessons on:
      --Advertising
      --Writing, Response, and Revision
      --Short Story Analysis
      --Journals
      --Poetry Critically Examined
      --Integrated Grammar
      --Analyzing Characters
      --News
"Getting Started as a Teacher of Critical Thinking"
   --Critical Questions
   --Being Fair to Those Who Disagree
Naming a Product
Tasks in a Travel Agency
Business Letter Models
"Applied Communications" Worktexts and Instructor's Guides for:
      --Module 3: Using Problem-Solving Strategies
      --Module 7: Following and Giving Directions
      --Module 9: Presenting Your Point of View
      --Module 12: Communication to Solve Interpersonal Conflict

"LIFE SITUATIONS ENGLISH": PILOT LANGUAGE ARTS COURSE: GRADE NINE

INTRODUCTION:

"Life Situations English" offers ninth graders a language arts course emphasizing communication skills necessary to meet the demands of citizenship and the workplace. This course is unique in several important respects. It develops reading, writing, listening, speaking, interpersonal and critical thinking skills by focusing on life situations, especially professional/technical careers. It is organized around topics relevant to the experiences and interests of ninth graders: classroom practices, impressions, relationships, cultural diversity, law and authority, entertainment, work and responsibility, and communication. It emphasizes individual and group projects having practical ramifications. Furthermore, assignments and activities leading up to work on projects provide students with a strong academic foundation at least comparable in quality to the foundation offered by traditional ninth grade English courses. Indeed, traditional materials are interwoven with real life situations to encourage breadth of understanding and insight.

By helping students see the practical implications of their work while offering them a strong academic foundation in reading, writing, and critical thinking, by fostering the abilities to listen, speak, and work cooperatively with others, by examining communication skills in life situations, this course is an effective response to the recent appeal for educational reform voiced in Learning a Living: A Blueprint for High Performance, the April 1992 report by the Secretary's Commission on Achieving Necessary Skills. This SCANS report, produced by the U.S. Department of Labor, declares: "Our message to teachers is this: Look beyond your discipline and your classroom to the other courses your students take, to your community, and to the lives of your students outside schools. Help your students connect what they learn in class to the world outside." "Life Situations English" enables teachers to connect the study of language arts with the world outside.

COURSE DESCRIPTION

The course is divided into eight sections, each of which includes assignments and activities culminating in projects. The time spent on these topics will vary, of course, depending upon the distinctive circumstances of a particular class. One possible distribution of time is indicated after the heading for each topic.

I. CLASSROOM PRACTICES

A. ASSIGNMENTS AND ACTIVITIES: PREPARATION FOR THE PROJECTS: (3 weeks)

1. Build working relationships:

   Interviews:

   --Brainstorm to develop questions to use when interviewing a partner.
   --Interview a partner and write a summary of the interview.
   --Introduce your partner to the class.

2. Collaborate in groups:

   Collaborative writing:

   --With a group, write collaboratively on what happens the first week of school. Brainstorm to find a specific subject.

   Analyzing how groups work:

   --While working in groups, identify the different ways in which group members behave and consider how to evaluate them.

   --Practice listening activities (such as having one person whisper a message to another, who will then pass it on--until after five exchanges the final recipient tries to repeat the message).

3. Select vocabulary and spelling words:

    --Identify and write down ten spelling and vocabulary words which came up during classroom discussion and which everyone needs to know.

    --Working together in a group, help everyone learn these words. Practice spelling and defining these words by having a contest with other groups.

4. Analyze filing systems:

    --Examine different kinds of filing systems and choose the one best suited for members of the class. Task analysis should be emphasized for this project, and throughout the year students should continue thinking of projects in terms of particular steps and objectives.

5. Read and analyze one of the following short stories:

    Ivan Southall. ASH ROAD. St. Martin's, 1966. (How three inexperienced young campers in Australia face up to responsibility.)

    Mary O'Hara. MY FRIEND FLICKA. Lippincott, 1943. (A story involving a boy's faith in a horse said to be impossible to train.)

6. Invite a guest speaker:

    --To prepare for the guest, write questions.
    --During the presentation, listen carefully, take notes, and from these notes make an outline of the presentation.
    --Notice the speaker's style of presentation.
    --Write thank you letters.

B. **FINAL PROJECTS:**

1. Create regulations for the functioning of class.

2. Practice working in groups:

    In groups, develop forms for evaluating both group operation and the results produced by groups:

    --Daily log of individual participation in a group.

--Standardized evaluation form to evaluate group's effectiveness.
--Guidelines for working in groups.
--Flow charts and other tools for depicting the operation of a group and for performing a task analysis of how a group functions.

3. Organize a three-ring binder with assignment sheets.

4. Begin an individual portfolio to be kept in the classroom and maintained throughout the year. This portfolio will contain both individual work and individual contributions to group projects. Each student will select for inclusion in the portfolio samples of work done all year. Periodically students will review their own portfolios to evaluate their development and mastery of the skills "Life Situations English" covers.

C. LEARNING OUTCOMES:

Work on the topic "Preparing for Success" involves the following skills:

Critical thinking:
  --making decisions
  --organizing time and materials
Listening and speaking
Reading for content
Interpersonal relations:
  --working in groups
Writing:
  --correct sentences, parallel structure

Appropriate assessment methods should be used while working on the topic "Preparing for Success" to make sure students are developing these skills.

II. IMPRESSIONS

A. ASSIGNMENTS AND ACTIVITIES: PREPARATION FOR THE PROJECTS: (4 weeks)

1. Practice writing description:

--Display edible objects such as apples, oranges, donut holes, popcorn, and pretzels. Ask students to write a description of one of these objects without naming it.

BEST COPY AVAILABLE

--Read a chapter of Steinbeck's "Travels with Charlie" in which an empty room is described. From the appearance of this room, the narrator infers the character of the personality who last occupied it. Write a description of someone's personality by inferring it from an old shoe, shirt, or other object.

--Examine an unfamiliar tool from a professional/ technical class (e.g., woodshop, manufacturing, home economics) to infer what its uses might be. Write a description of the object and give reasons for thinking it works the way it seems to.

2. Read and analyze a short story or non-fiction:

Fiction:

Edgar Allan Poe. "The Cask of Amontillado." (See appendix.)

Paul Zindel. "The Undertaker's Gone Bananas." Bantam, 1978.

Non-fiction:

"The Battery" (See appendix.)

3. Practice speaking and listening:

--While a partner or a group tries to draw it, describe an object without mentioning its use.

--Describe how a workplace such as a kitchen, automotive shop, or computer lab is arranged and explain why the arrangement is, or is not, an efficient use of space. Those listening will take accurate notes on the workplace described and will be able to comment on the layout.

4. Give instructions:

--Bring a set of instructions from home as an example of written instructions.

--Create an object independently or in groups and write instructions for its assembly.

--Write instructions for performing an everyday activity. Have a student attempt to perform an activity by following a classmate's instructions.

--Talk about the steps in a task.

5. Explain a process:

--Without naming it, describe how something works that you use every day.

--Explain how a piece of sports equipment works. The class will take notes and ask questions.

6. (Optional) Applied Communications Module 7: "Following and Giving Directions:

--Consult accompanying materials.

7. Select vocabulary and spelling words:

--Identify and write down ten spelling and vocabulary words which came up during classroom discussion and which everyone needs to know.

--Working together in a group, help everyone learn these words. Practice spelling and defining these words by having a contest with other groups.

8. Invite a guest speaker:

--To prepare for the guest, write questions.

--During the presentation, listen carefully, take notes, and from these notes make an outline of the presentation.

--Notice the speaker's style of presentation.

--Write thank you letters.

B. FINAL PROJECTS:

1. Each student will write a set of instructions explaining how to construct, prepare, or repair a physical object.

These instructions should be preceded by a task analysis to identify steps involved in the project. Both the task analysis and the final instructions will be written in complete sentences.

2. Students working in groups will prepare for parents detailed instructions on how to get through one day of high school as ninth graders. This description of how a school day unfolds and how a student should respond should be preceded by a task analysis identifying, for example, the demands, pleasures, and difficulties of each part of the day and how students react. Both the task analysis and the final project should be written in complete sentences.

C. LEARNING OUTCOMES:

Critical thinking:
- --problem solving
- --task analysis

Interpersonal relations: working in groups
Listening and speaking
- --following written and oral instructions

Reading for content
Writing
- --organizing a paragraph by composing a topic sentence
- --organizing a paragraph using spatial locations
- --thinking about the audience for writing and speaking
- --selecting effective words
- --using transitional words between sentences and paragraphs

III. RELATIONSHIPS

A. ASSIGNMENTS AND ACTIVITIES: PREPARATION FOR THE PROJECTS: (4 weeks)

1. Identify the issues:

   --Brainstorm relationships to identify problems among high school students, between parents and teenagers, between authority figures and students. (Consider, for example, intimidation and fighting, peer pressure, and racial prejudice.)

--Examine and observe problems in relationships by viewing television shows and movies, reading, speaking to others, listening carefully, and writing.

2. View films, television shows, and video tapes depicting relationships:

Examples:

Videos:

(Optional) Applied Communication Module 12: "Communicating to Solve Inter-personal Conflict." Consult accompanying materials.

Movies:

"Breaking Away"
"The Dead Poets' Society"
"Ferris Bueller's Day Off"
"Lean on Me"
"My Bodyguard"
"Rebel Without a Cause"
"Stand and Deliver"

3. Read about relationships:

Select some of the following materials and study relationships in them. Find out, for example, what characters say and do to each other, what behavior pleases or displeases them, why they disagree, and how they settle conflicts. (See Critical Thinking Handbook, pp. 118, 138 in appendix.)

Advice columns:

"Dear Abby"
"Ann Landers"

Magazines:

Any magazine interesting to teenagers (e.g., "Seventeen," "Choice")

Drama:

William Shakespeare. "Romeo and Juliet"

Kurt Vonnegut, Jr. "The Kid Nobody Could Handle"

John Steinbeck. "Of Mice and Men."

Tennessee Williams. "The Glass Menagerie."

Fiction:

Raymond Barrio. "The Confrontation," in INSIGHTS. McGraw-Hill Literature Series.

John Collier. "The Chaser"

Frank R. Stockton. "The Lady and the Tiger"

S. E. Hinton. "The Outsiders"

Willa Cather. "Paul's Case." (A short story about a teenager's struggle to adjust to daily life.)

Norma Fox Mazer. MRS. FISH, APE, AND ME, THE DUMP QUEEN. Avon Book, 1984. (A motherless girl is rejected at school because her father runs a garbage dump.)

Cynthia Voigt. HOMECOMING. Ballantine Books, 1981. (Four children are left motherless and virtually penniless. They go on a great adventure searching for someone to live with.)

Jessamyn West. "Then He Goes Free," in ADVENTURES II. Harcourt, Brace, Jovanovich.

Luigi Pirandello. "War," in JOURNEYS. Harcourt, Brace, Jovanovich.

Donald Keyes. "Flowers for Algernon."

Poetry:

Robert Herrick. "Upon Julia's Clothes."

Shakespeare. "Let Me Not to the Marriage of True Minds" and "My Mistress' Eyes are Nothing Like the Sun." (See appendix.)

4. Write about relationships:

Summarize in writing the main points about relationships present in the reading:

--list characters
--identify occasions when they agree
--note causes of disagreement and conflict
--record solutions to conflict

Writing in groups:

--write responses to problems in relationships
--write letters offering advice

5. Perform role playing exercises in groups, acting out relationships.

6. Invite a guest speaker:

--To prepare for the guest, write questions.

--During the presentation, listen carefully, take notes, and from these notes make an outline of the presentation.

--Notice the speaker's style of presentation.

--Write thank you letter.

7. Select vocabulary and spelling words:

--Identify and write down ten spelling and vocabulary words which came up during classroom discussion and which everyone needs to know.

--Working together in a group, help everyone learn these words. Practice spelling and defining these words by having a contest with other groups. (See appendix for suggestions about vocabulary and spelling practice.)

B. FINAL PROJECT:

Advice Manual:

Groups should work together to prepare (or the entire class could prepare) a handbook containing advice about how to create and preserve positive, constructive relationships with others. The impact of loaded language, actions, clothes, and various attitudes might be considered in such a manual.

This manual could contain designs and photographs to illustrate content. Its purpose is to inform and to give advice. The finished manual is intended for use by counselors and students.

C. LEARNING OUTCOMES:

Critical thinking:
  --analyzing relationships in videos, films, television shows
  --analyzing relationships in reading material
Interpersonal relationships: working in groups
Listening and speaking
Reading for content and to summarize main points
Writing:
  --expository prose
  --letters
  --persuasion
  --description
  --narration
  --summary

IV. CULTURAL DIVERSITY

A. ASSIGNMENTS AND ACTIVITIES: PREPARATION FOR THE PROJECTS: (4 weeks)

1. Investigate the cultures of high school students from various ethnic backgrounds:

   --Invite foreign exchange students to describe their native countries.

   --Interview students from a variety of ethnic backgrounds.

2. Investigate the treatment of minorities at your high school.

3. Brainstorm the psychological experience of being an outsider.

   --Recall times when you felt left out.

   --Explain this feeling and its causes in a paragraph. Do clothing styles or sports ability, for example, influence whether or not a person feels left out?

4. Read about those from various cultures.

   Dan Inouye. "Why Don't You Wear Shoes?" in INSIGHTS (McGraw-Hill Literature Series).

   Tony Dicamberra. "Raymond's Run."

Laurence Yep. DRAGONWINGS. Harper and Row, 1975. (This short novel is full of high adventure and it also describes the traditions of the Chinese community making its way in America.)

Kurt Vonnegut. "Harrison Bergeron" in INSIGHTS (McGraw-Hill Literature Series).

Hila Colman. CHICANO GIRL. Morrow, 1973. (Contrasts three young women in a story about sixteen year old Donna's growing awareness of her own attitudes. She lives near the Arizona border.)

Frank Bonham. VIVA CHICANO. E.P. Dutton, 1970. (Keeny Duran is proud, at 17, of his Mexican heritage. Police chase him.)

Nicholosa Mohr. IN NUEVA YORK. Dial, 1977. (Collection of short stories about various people who frequent a diner in New York.)

Paula Fox. THE SLAVE DANCER. Bradbury, 1973. (This short novel presents a slave ship and its atrocities. A white boy is made to play while slaves must dance.)

--Individual groups should then write a summary of each story.

--Apply to these stories the "Question Matrix" (see appendix) to understand the behavior of characters and main ideas.

--Each group should orally report to the class its interpretation of one of these stories.

5. Prepare for and listen to guest speakers:

--Invite a guest speaker to answer questions about cultural and ethnic diversity, especially within the United States.

--To prepare for the guest, write questions. (Use "Question Matrix" in appendix.)

--During the presentation, listen carefully, take notes, and from these notes make an outline of the presentation.

--Notice the speaker's style of presentation.

--Write thank you letters.

6. Select vocabulary and spelling words:

   --Identify and write down ten spelling and vocabulary words which came up during classroom discussion and which everyone needs to know.

   --Working together in a group, help everyone learn these words. Practice spelling and defining these words by having a contest with other groups.

B. FINAL PROJECT:

1. Write an individual report on ethnic diversity in your school or community. This report should be suitable for distribution to school administrators, teachers, and the general school population.

   A. Investigate the topic first by working in groups. For example, is racism a result of the presence of students from diverse ethnic backgrounds? What forms does it take? What is a solution to this problem?

   B. Divide the tasks to be performed by group members to gain information. Tasks might include:

      --Interviewing administrators to discover policies on hiring minorities and policies for admitting and teaching minorities.

      --Interviewing students to gain their insights about racial strife or experiences of minorities in the school.

      --Reading school publications (handbooks, policy statements) on ethnic diversity.

   C. Working in groups, put together your findings and arrive at a list of facts and some conclusions based on this evidence.

   D. Work in groups to make a poster illustrating some important point about cultural diversity.

   E. Write your own individual report using the results of shared investigation.

C. LEARNING OUTCOMES:

- Critical thinking:
  - --brainstorming
  - --investigating a subject
  - --problem solving
- Interpersonal relations group work
- Listening and speaking
  - --telephone skills
  - --oral presentation
  - --listening to speaker
  - --asking questions of speaker
- Reading for content:
  - --short stories
  - --articles
- Writing:
  - --thank you letter
  - --report
  - --notetaking
  - --summary

V. LAW AND AUTHORITY

A. ASSIGNMENTS AND ACTIVITIES: PREPARATION FOR THE PROJECTS: (5 weeks)

1. Practice critical thinking:

   Brainstorm to identify problems teenagers have with law and authority.

   --List rules at school and at home, such as rules about hazing, dress, lunch leaves, locker inspection, curfew, chores. Discuss how effective and fair these rules seem to be.

   --Identify problems such as extreme verbal and physical intimidation which occur on school property, particularly after school.

   --Examine the student handbook to gain information about school policies and regulations which are meant to prevent serious problems.

2. Apply traditional problem solving techniques to understand and remedy problems:

   --identify the problem
   --limit the problem

BEST COPY AVAILABLE

--look for possible solutions
--consider criteria for best outcome
--select the best solution
--implement the solution

3. (Optional) Applied Communication Module 3: "Using Problem Solving Strategies," and Module 9: "Presenting Your Point of View."

   --Consult accompanying materials.

4. Play critical thinking games (see appendix) to practice solving problems:

   Practice group collaboration:

   Divide into groups to develop solutions to problems. Groups might debate with one another on the issues.

   Practice reading for content and understanding:

   Read one of the following short stories and find its connections with your own situation.

   Non-fiction:

   Thomas Jefferson. "The Declaration of Independence" (The "Declaration" may be useful if it is considered mainly as a claim about fundamental rights to be enjoyed by each citizen. It raises questions about the appropriateness of rules and regulations that might limit these fundamental rights.

   The Bill of Rights. (See appendix for helpful materials.)

   Martin Luther King, Jr. "I Have a Dream" in ADVENTURES II. Harcourt, Brace, Jovanovich. (Consider the laws that seemed to make this speech necessary. Are there equally legitimate dreams that rules and laws seem to thwart unjustifiably?)

   Fiction:

   Shirley Jackson. "The Lottery." (In this friendly little village, a lottery chooses a scapegoat to die for the people.) (See appendix.)

Richard Connell. "The Most Dangerous Game." (The general of his own island rules absolutely.) (See appendix.)

Morley Callaghan. "All the Years of Her Life." (Short story about a boy who steals from the drugstore where he works.)

Ambrose Bierce. "An Occurrence at Owl Creek Bridge."

Practice writing:

1. Write a summary of the assigned short story. Then explain any useful insights or information it offers about the role of laws or the behavior of authority figures.
2. Practice the persuasive paragraph by writing a letter to a parent, student body officer, teacher, or coach persuading that person to change his or her position on some matter affecting you or other students.
3. Watch the video "Twelve Angry Men." Keep a diary of where people are at the start, and where they are at the end. Write an explanation of the persuasive techniques that caused them to change their minds.

5. Invite a guest speaker:

--To prepare for the guest, write questions.

--During the presentation, listen carefully, take notes, and from these notes make an outline of the presentation.

--Notice the speaker's style of presentation.

--Write thank you letters.

6. Select vocabulary and spelling words:

--Identify and write down ten spelling and vocabulary words which came up during classroom discussion and which everyone needs to know.

--Working together in a group, help everyone learn these words. Practice spelling and defining these words by having a contest with other groups.

B. FINAL PROJECTS:

1. Conduct a trial. The class is the jury. Classmates play the roles of judge, defense attorney, prosecuting attorney, witnesses. The trial should deal with an issue that is of immediate concern to students.

2. Investigate a situation which displeases students. Then write a proposal which explains the case and presents reasons for changing the situation.

3. Read a mystery story. Decide why the crime occurs and list the values the story supports when the criminal is caught and punished. Write a different ending for the story which conveys different values. This revised ending should be accompanied by a one page explanation of the behavior and values it is meant to support.

C. LEARNING OUTCOMES:

Critical thinking:
  --problem solving methods
  --reasoning from evidence
  --persuasive techniques
Interpersonal relations:
  --working in groups
Listening and speaking:
  --panel discussion
Writing:
  --brainstorming
  --persuasive writing
  --expository writing
  --letter writing
  --note taking

VI. ENTERTAINMENT

A. ASSIGNMENTS AND ACTIVITIES: PREPARATION FOR THE PROJECTS: (5 weeks)

1. Write about what you like to do:

   --Describe the music you enjoy, or your favorite place to visit, or the activity you most enjoy.

   --Persuade a critical parent or friend to try your favorite activity or visit your favorite place.

- --Compare and contrast different activities you like or different places you enjoy visiting.

- --Identify the different places social groups like to go. Write about how these places are similar and how they differ. Consider, for example, the music played there, the food available, and clothing styles worn to this place.

- --Write about where you would go and what you would do if you had $10.00 and a friend new to the neighborhood also had $10.00.

2. Read about entertainment--places to go and things to do:

Read some of the following materials, summarizing the main points in writing:

Non-fiction:

--Books describing travel adventures: (e.g., Charles Kerault. "A Life on the Road.")
--Travel guides (e.g., those published by the American Automobile Association) and brochures.
--Materials published by the Chamber of Commerce
--Brochures describing things to do
--Arts and Entertainment articles in magazines and newspapers
--Magazines, newspaper articles, and guidebooks dealing with things you like to do such as play Nintendo, ski, play a musical instrument, cook.

Poetry:

Shel Silverstein. "Sarah Cynthia Sylvia Stout Would Not Take the Garbage Out" in THE OXFORD BOOK OF CHILDREN'S VERSE IN AMERICA, ed. Donald Hall. Oxford University Press, 1985. (See appendix.)

Ogden Nash. "The Purist" in THE OXFORD BOOK OF CHILDREN'S VERSE IN AMERICA, ed. Donald Hall. Oxford University Press, 1985. (See appendix.)

3. Invite a guest speaker:

--To prepare for the guest, write questions.

--During the presentation, listen carefully, take notes, and from these notes make an outline of the presentation.

--Notice the speaker's style of presentation.

--Write thank you letters.

4. Select vocabulary and spelling words:

--Identify and write down ten spelling and vocabulary words which came up during classroom discussion and which everyone needs to know.

--Working together in a group, help everyone learn these words. Practice spelling and defining these words by having a contest with other groups.

B. FINAL PROJECTS:

1. Prepare a resource guide for students new to the area. This guide to your community should contain text, maps, menus, pictures, schedules, directions, and any other information considered to be helpful to the reader. The guide will be made available to students and advisers.

Project tasks:

--Decide the goals and uses for the project (such as distributed to all ninth graders, filed in the counselor's office, kept in the media center, kept in the library).

--Decide on the length of the resource guide to the community.

--Decide on the audience being addressed.

--Form groups and divide the tasks. Assign areas of research to these groups. Areas of research may include:
    --bowling alleys
    --costs
    --entertainment
    --food
    --libraries
    --cultural activities
    --malls
    --outdoor activities
    --roller rinks
    --theaters
    --transportation
    --youth organizations

--Groups will report the information they obtain from research.

--Class compiles information.

--Development of guide.

2. Replicate the workplace by preparing and producing a television show. Divide the class into groups and let each group present the kind of television show it prefers. This show may be presented live or video taped. Some possible kinds of television shows are a local news story, an expose program such as "Current Affairs," a serious news analysis such as "Sixty Minutes," or a serious talk show.

Project tasks:

Do a task analysis of the television program.

--Decide the steps to go through to prepare a broadcast.

--Decide who is responsible for different parts of the production. Chains of authority should be set up.

--Communicate with members of the production team not only verbally, but also by means of memos, business letters, reports, proposals.

--Gather information for the program.

--Summarize in writing the material to be presented on the show.

--Present the show to the class.

--The class should evaluate the presentation, using standards agreed upon by the class.

C. LEARNING OUTCOMES:

Critical thinking
  --developing investigative skills
  --analyzing material and attitudes
  --problem solving
Interpersonal relations:
  --collaborating in groups on a project
Reading for information

Writing:
- --description
- --persuasion
- --comparison and contrast
- --directions
- --explanations

VII. WORK AND RESPONSIBILITY

A. ASSIGNMENTS AND ACTIVITIES: PREPARATION FOR THE PROJECTS: (5 weeks)

1. Discover the work you and your friends do:

Brainstorm the various kinds of work done by high school students. (For example: homework, training for a sport, practicing a musical instrument, serving on a committee, cleaning up at home, running errands.)

--Brainstorm to decide what responsibilities different jobs involve.

Investigate the work experience of friends and family:

--In groups develop questions to ask family and friends about their jobs. You may wish to ask, for example, what their work involves? What parts of the job are enjoyable? What parts are not? What makes work fun? What makes work disappointing? What qualities lead to success in the job? What qualities make for a good or bad supervisor or co-worker or subordinate.

--Interview your own family and friends using the group's questions. Accurately write down the answers to interview questions. Prepare a clear written record of the interview.

Write letters to different companies asking them for information about the qualities they value in employees.

Write letters to different companies asking them for information about the qualities they value in employees.

2. Read about work experiences

Read one poem, and one biography or autobiography, and one short story chosen from the following or comparable selections:

Fiction:

Edmund Ware. "An Underground Episode" in JOURNEY. Harcourt, Brace, Jovanovich. (A man works on a pipeline, and needs to be aided by his co-workers.)

Alice Munro. "Boys and Girls." (Troubled by her father's work--raising, killing, selling foxes--a girl tries to rebel.)

Poetry:

Marge Piercy. "To Be of Use" in LITERATURE. Prentice Hall, 1991. (See appendix.)

Deborah Boe. "Factory Work" in WORKING CLASSICS. (See appendix.)

David Budbill. "Bobbie" in WORKING CLASSICS.

David Budbill. "Roy McInnes: The Man" in WORKING CLASSICS.

Paul Haber. "Randall Holmes" in WORKING CLASSICS.

Paul Haber. "Bill Hastings" in WORKING CLASSICS.

Paul Haber. "Chester Gleason" in WORKING CLASSICS.

Gwen Hauser. "One Day the Sand-Machine" in WORKING CLASSICS.

Gwen Hauser. "The Day After I Quit" in WORKING CLASSICS.

Compare what you read to what you learned from conducting interviews. Notice in the reading, for example, the following:

--how work affects people
--personal qualities that seem to cause or prevent success at work
--skills that contribute to success

--causes of friction or conflict among workers
--problems that must be overcome to accomplish a task or an objective

Write for high school students an explanation of behavior that will help them and behavior that will hurt them in a job.

3. Invite a guest speaker:

--To prepare for the guest, write questions.

--During the presentation, listen carefully, take notes, and from these notes make an outline of the presentation.

--Notice the speaker's style of presentation.

--Write thank you letters.

4. Select vocabulary and spelling words:

--Identify and write down ten spelling and vocabulary words which came up during classroom discussion and which everyone needs to know.

--Working together in a group, help everyone learn these words. Practice spelling and defining these words by having a contest with other groups.

B. FINAL PROJECT:

1. Identify some work that needs to be done and then accomplish the work.

Project tasks:

--Working in groups, investigate the school and the community to see what kinds of jobs might be done.

--In a written report, propose action to be taken.

--Analyze the task and write down the steps to be taken to accomplish the work.

--Follow the plan and perform the work.

--As if it were intended for the principal, write a report of the project and of the workers:

- --Was the task realistic? Could it be done?
- --Was the plan clear, complete, and easy to follow.
- --Were workers responsible? Did they work hard even on unpleasant jobs? Did they stay with a job until it was done? Did they socialize instead of working?
- --Did workers cooperate with one another?
- --Did they work as a team?

Possible work to be done:

--Clean up Johnson Creek.

--Recycle more effectively than is now the case.

--Make sure garbage does not collect in the halls after lunch.

--Address the ills of migrant workers or refugees (visit their worksites, identify their needs).

C. LEARNING OUTCOMES:

Analyzing how to accomplish a task
Accomplishing the work
Seeing how books and articles bear on real life situations
Interpersonal relations:
    --working in groups
Reading for content
Writing:
    --expository
    --narrative
    --persuasion
    --summaries
    --outlines

VIII. COMMUNICATION

A. ASSIGNMENTS AND ACTIVITIES: PREPARATION FOR PROJECTS: (6 weeks)

1. Examine advertising:

(See Critical Thinking Handbook, p. 112 in appendix.)

BEST COPY AVAILABLE

--Read and bring to class advertisements in magazines and newspapers.

--Watch advertisements on television and summarize them in writing. Bring this brief summary to class.

--Identify and list traits that make a successful advertisement.

--Brainstorm about the impact of advertising on how people view such things as
    --physical beauty
    --weight training
    --cosmetic surgery
    --athletes

--Notice words in advertisements that grab the reader. Discuss why these words are forceful and make an impression.

--Explain in writing the effects of a particular advertisement on your own or a friend's behavior.

2. Examine different kinds of written communication:

Read a variety of newspapers and magazines.

--Read magazines such as "Seventeen" expressly directed to teenagers.

--Read magazines specializing on a particular topic, such as "Hot Rod," "Car and Driver," "Popular Mechanics," "Soap Opera Digest," "Entertainment Weekly."

--Read gossip newspapers such as "The Sun," "The Star," "The Enquirer."

--Read traditional papers such as "The Oregonian" and "The New York Times."

Work in groups to analyze the characteristics of these different kinds of newspapers and magazines. To identify their personality, or style, consider such things as:

--subject matter
--word choice
--length of paragraphs

- --length of articles
- --facts presented
- --reliability of general claims
- --use of evidence
- --copy, ads, captions

Write a business letter or formal recommendation to the school librarian explaining why the library should subscribe to a particular magazine or newspaper.

3. Invite a guest speaker:

   --To prepare for the guest, write questions.

   --During the presentation, listen carefully, take notes, and from these notes make an outline of the presentation.

   --Notice the speaker's style of presentation.

   --Write thank you letters.

4. Select vocabulary and spelling words:

   --Identify and write down ten spelling and vocabulary words which came up during classroom discussion and which everyone needs to know.

   --Working together in a group, help everyone learn these words. Practice spelling and defining these words by having a contest with other groups.

B. FINAL PROJECTS:

1. Analyze the personality, or style, of a magazine such as "Sports Illustrated," "Cosmopolitan," or "Mad" or "People." Then based on your analysis, create a character who represents the personality of this magazine: for example, Mr. Sports Illustrated, Ms. Cosmopolitan.

   --List the character's qualities

   --Describe the character's personality.

   --Explain the kinds of friends the character would have.

   --Consider the kind of trouble the character might get into.

--Imagine the kinds of good things the character might do.

Using this information, invent an exciting crisis, or conflict, or other kind of situation concerning your character. Write an article about the incident for a specific newspaper or magazine.

2. Produce a brochure discussing how communication skills are used in a variety of occupations. This brochure is intended for teachers, advisers, and students.

Procedure: do research to prepare:

--Identify 6 general kinds of occupations (e.g., arts and communications, medical).

--Divide class into groups sharing common interest.

--Each student selects a specific occupation based on interest.

--Students discover the communication skills used in specific occupations (e.g., computer, interviewing, writing).

--Groups compile results into a brochure.

C. LEARNING OUTCOMES:

Critical thinking
    --analyzing advertisements and articles in newspapers and magazines
Interpersonal relations
    --working in groups to reach conclusions and to produce a television show
Listening and speaking
Reading for content and style
Writing:
    --listing
    --expository material
    --summaries

420

BEST COPY AVAILABLE